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Provide Cover page, content page and first page of "Advances in Structural Engineering and Rehabilitation" Innovations in Electrical and Electronics Engineering for 2019-20, Water Resources and Environmental Engineering I for 2018-19, Enhancement of Dynamic Performance of Brushless DC Motor Drive Coordinate reference frame technique for robotic path planar path planning for 2017-18, Enhancement of consumer reliability by using distributed generation", Cost benefit analysis of distribution network by allocating renewable DGS using PSO, Proceedings pp~52, 27-29 April 2017, Springer for 2016-17, Enhanced DFT Algorithm for Estimation of Phasor by PMU in Harmonic Environments for 2015-16 with ISBN numbers, title, author, Department/ School/ Division/ Centre/ Unit/ Cell, name and year of publication.

HEI Response

Complete details as asked above are provided as per the following order:

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3.4.4 Details of Books and Books chapters in edited volumes

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1	Dr. Partheepan Ganesan	Advances in Structural Engineering and Rehabilitation	Finite element simulation of Impact on RCC water tank	Springer

Lecture Notes in Civil Engineering
Sondipon Adhikari
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Finite Element Simulation of Impact on RCC Water Tank

Partheepan Ganesan, M. V. A. N. Jagadeesh Babu, M. Nizamuddin and T. Sai Ram Kiran

Abstract Finite element simulation of the impact analysis of circular and rectangular water tanks subjected to projectile impact has been carried out using ANSYS Explicit Dynamics 15.0. Analyses were performed by considering both with water and without water for circular and rectangular water tanks. The different impact velocities considered in the present study were 50, 100, 200 and 400 kmph. The water tank is considered to be fixed at slab base. Due to the limitation on the maximum number of nodes in the academic version of ANSYS, finite element modelling of water tank has been carried out on a water tank of reduced capacity of 4400 L. The reduced tank has a height of 1.40 m and diameter as 2 m. The size of meshing is taken as 100 mm, and thickness of the base slab considered is 150 mm. Salient results such as total deformation, principal stresses, equivalent stresses, normal stresses and the directional deformation for both circular and rectangular tanks with water and without water cases for the different velocities were obtained. The comparison of the various results for the different cases was detailed. It is observed that with the use of finite element simulation, one can come to an optimized shape of the tank with least amount of internal stresses developed within.

Keywords Finite element · Water tank · Reinforced concrete · Impact velocity · Explicit analysis · ANSYS

1 Introduction

Concrete structures in the past were not designed for impact load in a direct manner, but indirectly it was dealt using partial safety factors, etc. Structures behave very differently when it is subjected to impact loads than that of static loads. Impact load is the one which is applied over a very short duration. This is most important in the case of vehicle impact on the structure, marine structures experiencing impact forces

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Power System Security Analysis Using FACTS Devices by Means of Intelligent and Hybrid Techniques Under Different Loading Conditions

S. Venkata Padmavathi, A. Jayalaxmi and Sarat Kumar Sahu

Abstract Power system security issue is a severe concern in restructured power market. In order to conserve the security of a system, flexible alternating current transmission system (FACTS) apparatus are one of the options. In this work, node voltage deviations and line apparent power flow factors are taken as the security indices and these are considered as objectives for security problems. The devices considered are thyristor-controlled series capacitors (TCSCs), static VAR compensators (SVCs), and unified power flow controllers (UPFCs). The main idea of this work is to compare distinct algorithms such as hybrid differential evolution (DEPSO) and fuzzy adaptive gravitational search algorithm (FAGSA) to attain the good location of the devices on IEEE 30 bus network with loading conditions.

Keywords DEPSO · FAGSA · FACTS · TCSC · SVC · UPFC

1 Introduction

Today's power network has become tortuous and less secure with increase of power demand. FACTS apparatus can augment power system transfer capacity and flexible line flow control [1]. These devices play a major task in power system security and can control the network parameters to influence the line power flows and voltages [2–4]. There are various types of FACTS controllers: SVC [5, 6], TCSC [7], UPFC [8], etc.

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2	Dr. K Rajeswara Rao Dr. P. Markandeya Raju	Water Resources and Environmental Engineering I	Special Considerations for Design of Storm Water Drainage System—A Case Study	Springer
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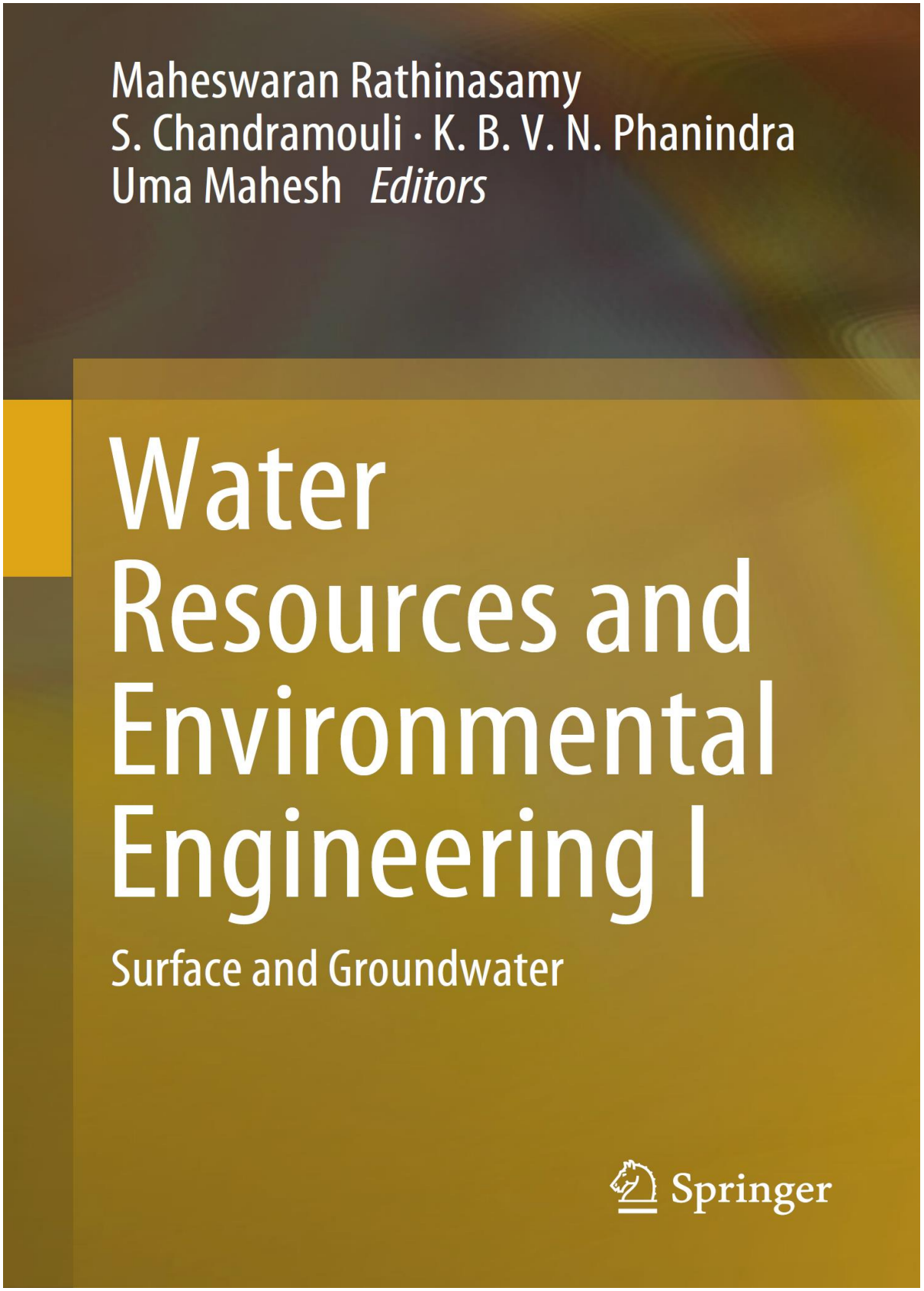
4	Dr. S. Chandramouli	Water Resources and Environmental Engineering I	MATLAB Code for Linking Genetic Algorithm and EPANET for Reliability Based Optimal Design of a Water Distribution Network	Springer
5	Dr. R. Maheswaran	Water Resources and Environmental Engineering I	Regime-Wise Genetic Programming Model for Improved Streamflow Forecasting	Springer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A Study on Assessment of Groundwater Quality at Certain Industrial Zones in Visakhapatnam, Andhra Pradesh

P. V. R. Sravya, T. P. Sreejani and G. V. R. Srinivasa Rao

Abstract The present work aims at the evaluation of groundwater quality at certain industrial areas in and around Bharat Heavy Electrical Limited (BHPV), Natural Thermal Power Corporation Ltd. (NTPC) and Hindustan Petroleum Corporation Ltd. (HPCL) in Visakhapatnam city, Andhra Pradesh. Ground water samples are collected from all the three industrial zones and subjected to physico-chemical analysis for various parameters such as pH, Turbidity, Conductivity, Total Acidity, Total Hardness, Chlorides using standards of APHA. Water Quality Index is calculated by using the popular NSFWQI method and the quality of the water is rated as unfit for drinking. The data is subjected to statistical analysis using SPSS 20.0 software. The statistical methods used for the data analysis are Cluster Analysis and Factor Analysis. Based on the WQI and Statistical analysis, the contamination is observed due to the presence of excess amounts of hardness and chlorides.

Keywords SPSS 20.0 · NSFWQI · CA · FA · Physico-chemical parameters

1 Introduction

Safe drinking water is a necessity for human beings to sustain their life. The use of water in agriculture, domestic purpose, industrial applications, construction purpose, etc., also necessitates good quality. Quality of water refers to the chemical, physical, biological, and radiological characteristics of water. The quality of groundwater gets affected when various impurities/pollutants join the groundwater table.

On-site sanitation systems, effluents from industrial activities, leaking sewers, excess amounts of fertilizers applied in agricultural activities and existence of toxic

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Special Considerations for Design of Storm Water Drainage System—A Case Study

Kuppili Rajeswara Rao and Ponnada Markandeya Raju

Abstract Urban Floods are becoming more frequent owing to the lack of proper storm water drains. In this paper we discuss some of the important design features that need to be considered for design of storm water drainage system using a real-world case study. The flood events during September–December 2010 in the southern side of the Visakhapatnam city (INDIA) were considered. The recommendations are evolved through ground reconnaissance survey, hydro-meteorological and hydrological studies.

Keywords Storm water drain · Inundation · Encroachments · Water hyacinth, etc.

1 Introduction

Unevenly distributed high-intensity rainfalls coupled with draining canals of inadequate capacity are the common causes of urban flooding. Researchers predict that rapid urbanization with poor town planning aggravated by climate changes are the most important cause the inundation of the urban areas. The main causes of Urban Flooding are Heavy Rainfall/Flash floods/coastal floods/river floods, Lack of Lakes/ponds, Siltation of drains, Siltation of water bodies and other Natural Causes. Human interventions like Deforestation, Constructions on existing natural storm water drains, Unplanned urbanization, increased paved area and decreased agri-cultural land (acting as a percolation zone) and Clogging of water carriers due to dust, garbage chocked gully gratings, bell mouths of roads and inlets of street drains, passing of cables, pipes across the drains, Garbage dumping in or on drains, etc., also result in Urban flooding. The flooding affects every section of people/

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Evaluation of Utilization of Wavelet Denoising Approach in Calibration of Hydrological Models

Maheswaran Rathinasamy, Akash Choudary and Anuj Jaiswal

Abstract Hydrological modeling can be very useful in studying the hydrology of the system and managing the water resources of the system in a sustainable way. Calibration of the hydrological model is an important step in model development and application. Calibration becomes difficult particularly when the input variables of the model is of poor quality and contaminated with noise. In order to improve the calibration and aid in modeling, denoising of the data has been used in past. In this study, a hydrological model for the Wainganga basin, India using SWAT coupled with wavelet denoising is developed. The model performance of the wavelet coupled SWAT model is compared with the simple SWAT model. For the purpose of the model calibration 8 years were used and the model validation was done using 3 years of data. The results from the study show that the wavelet-based denoising significantly improved the model performance and also aided model calibration.

Keywords Wavelet denoising · SWAT model · Model calibration

1 Introduction

Hydrological models are being extensively used to study large catchments and water resources management problems. Hydrological models are conceptual representations of a part of the hydrological cycle. They use inputs which are properties related to the actual catchment characteristics and simulate a particular process of the hydrological cycle such as groundwater, surface runoff, contaminant transport, etc.

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MATLAB Code for Linking Genetic Algorithm and EPANET for Reliability Based Optimal Design of a Water Distribution Network

S. Chandramouli

Abstract Many researchers have developed different approaches for optimal design of water supply pipe networks. But, none of them provide a detailed coding for design procedure involved. Students and young researchers who are working in field of water distribution networks generally spend their valuable time searching for the procedure to link up Genetic Algorithm (GA) and EPANET. Therefore, in order to facilitate the young researchers and students, a detailed design procedure using EPANET solver with Genetic Algorithms in the MATLAB for reliability-based optimal design of water supply pipe networks is developed and presented in this paper with a case study.

Keywords MatLab · Epanet · Water distribution network · Reliability Optimal design

1 Introduction

Optimal design of a pipe network is essential for any water distribution system since the 70% of the total cost is due to pipe network of the system. The practical importance and inherent complexities involved in the optimization of networks for distributing drinking water has attracted the attention of many in the past 30 years [1]. Basically, the optimization is the process of identifying a solution that is best in fulfilling the objective while satisfying the constraints. The objective may be minimizing cost or maximizing benefits. Numerous solution methods developed in the recent past for water pipe network optimization problem using different formulations such as Linear Programming [2–4] Nonlinear Programming [5, 6] heuristics and metaheuristic methods like Genetic Algorithm [7–11] Simulated annealing [12–14] Tabu search [15, 16] Differential evolution [17, 18] Memetic

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Regime-Wise Genetic Programming Model for Improved Streamflow Forecasting

K. Bhavita, D. Swathi, J. Manideep, D. Sree Sandeep and Maheswaran Rathinasamy

Abstract Forecasting of stream flow plays a vital role in flood forecasting studies, design, and operation of reservoirs. Several approaches such as physical models, conceptual models and statistical/black-box models are used to model complex uncertain peak flows in rivers. In the past, Genetic Programming (GP) have been a widely used for different hydrological applications. In this study we propose a regime-wise genetic programming model for efficient forecasting of streamflow during peak flows. In this approach, we first classify the flows into three regimes such as low, med and high based on their flow magnitude and develop separate GP models. The proposed approach was applied to a case study from Godavari River Basin, India. The results obtained show that the proposed approach of separate models for high flows performs better than the single model for all regimes.

Keywords Genetic programming · Streamflow forecasting · Flow regime

1 Introduction

Streamflow forecasting can be defined as prediction of flow rate in a stream in advance and also involves prediction of future inflow or flow rate of a particular stream [1]. Forecasting of flows has been an active area of research owing to its great importance in issuing flood warnings and providing the grounds for preventive actions. Generally stream flow predictions are based on observation of rainfall on the upper catchment, often supplemented by rainfall in the intervening catchments.

There are a variety of available methods for forecasting stream flows, which may fall into the following categories: process-driven methods and data-driven methods. Process–driven methods are simply a stream flow process in the view of a system theory, and mathematically approximate the internal physical process of the

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ENHANCEMENT OF DYNAMIC PERFORMANCE OF BRUSH LESS DC MOTOR DRIVE

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***Abstract*— Growing of industry and increasing demand in consumer load/distribution side place a new demand in mechanism connected with electrical motors. This is leading to different problems in working operations due to fast dynamic and instability. The stability of the system is essential to work at desired set target but due to non-linearity caused by a motor frequently reduces stability which reduces control ability to maintain speed/position at set points.**

BLDC motors are widely used in industries because high efficiency, low cost, roughest construction, long operating life noise less operation but the problem arises in BLDC motors are speed controlling by using sensor and senseless controllers and large torque ripples and torque oscillations. This paper presents assessment and evolution of the BLDC motor by providing proper voltage controller methods (back emf controller method) and analysis has done in MATLB/SIMULINK software. Therefore the parameters of the BLDC motor analyzed and compered with BLDC motor drive without any controller.

Keywords—brushless dc motor; back emf controller; hysteresis current controller.

I. INTRODUCTION

The concept of usage of excitation system with permanent magnet was first time introduced in 19th century. It was producing sudden sense of thrilling excitement in application of many electrical devices that are using in our daily life cycle. [1] The response of these types of machines in that particular time is very deplorably mergred.one of the main reason is deprived quality in material used. Due to innovation of alnico usage of magnetic material increases drastically because it has a property of very high cohesive force and very strong magnetic field [i.e. $B=1wb/m^2$]. [5] Predominately the materials used in BLDC motors samarium-cobalt and Neodymium iron-Boron (NdfeB) magnets.[3] Induction motors are extremely prevalent machine in the 20th century because it is easy structural design, cost effectiveness, high reliability and good dynamic performances. Even though better performance of ac machines, two factors are not replaced by dc machines. Those are starting mechanism and speed controlling of dc machine is superior as compare to the ac machines.

But the presence of commutator and brushes the usage of dc machines is diminished in present days. These two reasons need to compensate by some other means it can improve the usage of dc machines so that BLDC motor are comes into picture. It has a great extent of torque and high power to weight ratio and good high powered control for challengeable speed applications. Elimination of brushes and commutators makes brushless DC motor (BLDC) good choice for high performance applications. In brushless DC motor speed controller is perform by using sensors (i.e. hysteresis current controller) and sensor less (back emf controller).In these controllers to improve the response of the system PI controller is used although conventional PI controller are greatly used in industries because it has simple structure and it can implemented easily. PI controller pose problems like non linearity, and parameter variation etc. Therefore proportional+integaral control requires piecewise linearity approximation. For mathematical modeling PMBLDC machines has nonlinear model. The linear PI may no longer be suitable therefore many techniques has been came to boost the dynamic behavior of the BLDC motor drive.so that the system is less sensitive to load disturbances and parameter variations

In this paper we are introducing hysteresis current controller and voltage controller and performing how the parameters of PMBLDC motor drive are varying. However permanent magnet brushless DC motor is generally controlled by using (a) sensors (b) sensor less.[2] In sensored control of PMBLDC motor drive by sensing the position of the rotor through hall sensors actual position is measured it is feed back to the PWM regulator this regulator gives the actuating signal to the inverter. Depending upon the motor operation (forward, backward, stopping) switching sequence can be switched. But in the case of sensor less controller there is no sensors to know the position of the rotor in place of sensors the rotor position can be sensed by taking the back emf signal these back emf signals are feed back to the voltage source inverter and through proper logic circuit inverter switching sequence can be switched so that precise speed control is performed. [7]Hysteresis current control PMBLDC motor is preferred where starting torque varies greatly. [8] But the drawback of sensored based controller is especially critical at low speeds as well as during the starting conditions. Where as in some applications like aerospace and industrial applications back emf controller (sensor less) BLDC motors are used.

Using of permanent magnet brushless motor drive in electrical machines rapidly gaining popularity like in electrical

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3.4.4. Conference paper of faculty of Mechanical Engg

Name of the teacher	Title of the paper	Title of the proceedings of the conference	National / Internatio nal	Year of public ation	Affiliating Institute at the time of publicatio n	& Name of the publish er
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Coordinate Reference Frame Technique for Robotic Planar Path Planning

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Abstract

A Robot is swiftly advancing from workshop entity, which is objectively bound to its work cell, to a growingly intricate machine competent of doing demanding jobs in our day-to-day environment. A mobile robot which initially used for surveillance, reconnaissance and patrolling, extended its footprint in the areas of explosive devices handling, mine laying, communications relays, logistics transportation, convoy protection, road clearance, target identification and tracking, remotely operated weapons, disaster management, hospitality sector, home automation, driverless cars etc. This mobility is hugely dependent on the autonomy of the robot. Autonomous Mobile Robot (AMR) is one which is capable of traveling an uncontrolled arena without the supervision of the operator. Diverse approaches like vision-based techniques, fuzzy logic, artificial neural mapping, reactive navigation techniques, biologically inspired techniques, geometrical path planning etc. are used individually or combined to find the collision-free path. This paper discusses a new geometrical method called as Coordinate Reference Frame (CRF) approach for the navigation of mobile robot operating in a static environment consisting of elliptical obstacles. A mathematical formulation has been developed to obtain these paths and Center of Gravity Approach (CGA) is used to find the shortest among all obtained paths. The simulation results were implemented with an experiment. The results prove that the proposed approach to be very effective as the robot navigates to the defined target point without colliding with the obstacles in the arena. The cost involved in this project is very minimal, which makes this robot suitable for industries, hospitals, hotels, offices, etc. These kind of robots are very suitable for home robots, transportation robots, service robots, etc.

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Selection and/or Peer-review under responsibility of Materials Processing and characterization.

Keywords: Path Planning; Autonomous Robots; Collision Avoidance; Mobile Robot; Static Obstacles; Off-line Environment

1. Introduction

"In the twenty-first century, the robot will take the place which slave labour occupied in ancient civilization - Nikola Tesla" - Yes, it is everywhere. Starting from kid's toys to planetary rovers – it is everywhere. Gone those days where a robot serves you at a stationary point – this is the generation of mobility with autonomy. Autonomous mobile robot became a part in various sectors like industries, military applications, transportation of cargo, unmanned bomb disposal, planet and underwater exploration [1], supermarkets or airports [2] and as service robots for elderly persons at homes.

The buzz word in robot navigation is motion planning and an autonomous mobile robot should be capable of planning its own motion. It should know what motion to perform to reach the destination without colliding the physical objects. Other than some precisely engineered systems, it is hard to expect a robot to perform all possible motions to reach its destination. As a robot became more masterful, the need for path planning tools became more challenging. Path planning is not simple collision

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Augment Network Security with Playfair Cipher Using 9x9 Grid

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Abstract. Network security provides the protection from unauthenticated users from files accessing. Cryptography is one of the mechanism to obtain network security. Among many cryptographic technics, playfair cipher is a substitution cipher which is simple logic and provides more security. Existed method of playfair cipher is constructs 5x5 matrix using key alphabets and remain alphabets. In the matrix the plain text and key is only in alphabetical not accepted any numerical and special symbols which leads to decrease security. So that we proposed a new system augment network security with playfair cipher using 9x9 grid. The proposed matrix contains small and capital letters of alphabets, numerical and special symbols such that the cryptographic algorithm may take key with any characters and symbols.

Cost Benefit Analysis of Distribution Network By Allocating Renewable DG's Using PSO

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Abstract. In a distribution network, loads are heterogeneous in nature and fast growing load demand due to rapid urbanization and industrialization, the load impact on distribution networks leads to break down the feeder or disruption of power to the consumers. In order to overcome these problems, decentralized generation is viable alternative using Distributed Generators (DGs). The optimal DG allocation with appropriate size is a major challenge to attain optimal operation. This paper envisages that optimal location and size of DG's are determined by Particle Swarm Optimization technique using multi objective approach by considering economical and technical factors. The proposed method is implemented on standard IEEE and practical distribution networks.

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Enhanced DFT Algorithm for Estimation of Phasor by PMU in Harmonic Environments 2016/11

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***Abstract*—Due to the increased penetration of distributed generators into the distribution system as well as due to various power electronic devices in the power network, there exists strong disturbances in electrical waveforms i.e., in amplitude ,phase and frequency. These fluctuations need to be supervised and monitored for efficient energy management, safety and also protection purposes. Nowadays, this task is performed by Phasor Measurement Units (PMUs), which measure the phasor of voltage and current waveforms on a common timescale synchronized to the Coordinated Universal Time (UTC). Phasor Measurement Units (PMUs) are also expected to quickly measure fundamental frequencies and rate of change of such frequencies (ROCOF) by accurate parameter estimation algorithms. The commonly used algorithm for estimation of phasor if Discrete Fourier Transform (DFT). But, it fails in harmonic environments. In this paper, DFT algorithm was modified to improve its phasor estimation capability under such harmonic environments. Then, the performance of proposed algorithm is compared with the Least Square Error (LSQ), Recursive DFT algorithms.**

***Index Terms*—phasor measurement unit (PMU), recursive DFT algorithm, FIR filters.**

I. INTRODUCTION

Synchronized Phasor Measurement Units (PMUs), since their introduction in 1980s gave impetus to large-scale implementation of wide-area measurement systems (WAMS) using PMUs and phasor data concentrators (PDCs) in a hierarchical structure. Initially PMU technology applications are mostly concerned with the validation of system models, accurate postmortem analysis. With widespread application, they are able to perform linear state estimation and track dynamic phenomena in real time. Due to the utilization of time synchronized sampling for PMUs located over the entire power system, we are able to obtain simultaneously the individual phasor from individual PMUs located at remote areas also at particular instants of time. This lead to the PMUs utility to improve protection and control functions [1].

In Power Systems, high voltage transmission and distribution lines are important links from the generating units to the end users. Protection of these lines using relays plays a vital role from the view point of security, economics and quality of power supplied. Hence correct action of relays is important in power systems. Due to DC offset present in fault current waveforms the line relays tend to overreach. So, these DC offset components have to be removed from these waveforms [2].

As per [3] DFT based phasor estimation is the most commonly used technique in currently available PMUs. Two classifications of power system transients are electromagnetic transients and electromechanical transients. Electromechanical transients are characterized by magnitude and phase angle modulation of power system voltages and current with low frequency signals corresponding to the movement of rotors of large electric machines around the synchronous speed. Electromechanical transients are characterized by step changes in the magnitude and phase angles of the waveform. They contain sustained harmonics and non harmonic content. Disturbances in phasor estimations due to harmonics can be eliminated by DFT type phasor estimators.

With the advent of advanced microcontrollers and digital signal processors (DSPs) in relay implementation, DFT filter has gained importance for measuring fundamental and harmonic content of a waveform. DFT filter can be implemented in recursive and non recursive forms. Recursive DFT is commonly used algorithm .Errors are introduced during phase and magnitude estimation using DFT filter due to sampled signal dynamics and frequency deviations [4].

A practical PQ event data recorded at an industrial site consists of interruption, sag, swell, harmonics, transients, system imbalance, frequency deviations and combinations of these disturbances [5].

In [6] performance of recursive DFT when subjected to off-nominal frequency variations, decaying DC offsets, harmonics, inter-harmonics and noise were analyzed. Total Vector Error (TVE%) of recursive DFT under such scenarios is also observed. Based on the analysis a frequency tracked phasor estimation algorithm was developed in [7].This is done by estimating the fundamental frequency and then changing the nominal frequency of DFT when there is a change in the system frequency. But it does not perform well in presence of harmonics. This paper bridges the gap by developing a