Indrajit Pan, Siddhartha Bhattacharyya and Mithun Roy

Intelligent Multimedia Data Analysis

8. Intelligent greedy model for influence maximization in multimedia data networks

De Gruyter | 2019
https://doi.org/10.1515/9783110552072-008

Most Influential Node Selection in Social Network using Genetic Algorithm

Publisher: IEEE

Mithun Roy ; Indrajit Pan All Authors

Abstract: Goal of Influence Maximization problem is to find a top-k powerful nodes as a seed set which has a maximum influence with respect to a propagation model. This is NP-hard ... **View more**

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Abstract:

Goal of Influence Maximization problem is to find a top-k powerful nodes as a seed set which has a maximum influence with respect to a propagation model. This is NP-hard in nature. Most of the related algorithms are based on greedy methods, which are computationally expensive. Any exhaustive search algorithm can't discover the good solution in a sensible time. In this paper we introduce a performance oriented algorithm for solving the influence maximization problem using Greedy inspired Genetic Algorithm. We have observed that the performance of proposed algorithm is outperforming similar existing algorithms for maximizing influence Spread.

Published in: 2018 Fourth International Conference on Research in Computational Intelligence and Communication Networks (ICRCICN)

Date of Conference: 22-23 Nov. 2018 **INSPEC Accession Number:** 18721924

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ISBN Information: **Publisher:** IEEE

Conference Location: Kolkata, India

Contents

Overlapping Community Detection using Clique Proximity and Modularity Maximization

Publisher: IEEE

Mithun Roy ; Indrajit Pan All Authors

Abstract: Significant communities within social network contain some leading members. Detection of significant communities within a reasonable time is very difficult. This work pro... **View more**

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Abstract:
Significant communities within social network contain some leading members. Detection of significant communities within a reasonable time is very difficult. This work proposes a new algorithm for a significant community detection using clique proximity measurement and modularity maximization. This algorithm has initially detected disjoint communities. Then some key nodes are identified within this disjoint community which appears in more than one of these disjoint communities. These nodes are subsequently utilized to detect overlapping communities. Experimental results show that present community detection approach shows better performance in terms of modularity.

Published in: 2018 Fourth International Conference on Research in Computational Intelligence and Communication Networks (ICRCICN)

Date of Conference: 22-23 Nov. 2018 **INSPEC Accession Number:** 18721963

Date Added to IEEE *Xplore*: 23 May 2019 **DOI:** 10.1109/ICRCICN.2018.8718682

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Confidence Belief Function Weighted Parallel Rank-level Fusion for Face recognition

Aniruddha Dey ; Sourav Kumar Dey ; Alok Kumar Roy ; Manas Ghoslr ; Satadal Chakraborty ; De… All Authors

Abstract: In this paper, proficient feature extraction techniques using efficient neural networks (NN) with evidence theory for face recognition are presented. This approach is est... **View more**

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Abstract:
In this paper, proficient feature extraction techniques using efficient neural networks (NN) with evidence theory for face recognition are presented. This approach is established to reduce the computation periods required by these NN. Evidence theory based single or multi biometric fusion methods have established promising performance, but they cannot handle the uncertainty appropriately, suggesting that further improvement of the performance of single biometric authentication systems. Conventional ranking is upgraded, using some associations among the outputs (belief confidence factors) of a classifier. Then, the final result is achieved by fusing results from the combined classifier output (belief confidence factors) with evidence theory. The face database usually severely affected by various degradations such as, illumination, noise and pose variations etc. which affects the overall recognition accuracy. The outcome establishes that the proposed rank-level fusion method attains superior recognition accuracy than other feature extraction and other related rank level fusion approaches.

Published in: 2019 3rd International Conference on Electronics, Materials Engineering & Nano-Technology (IEMENTech)

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Elastic Window for Multiple Face Detection and Tracking from Video

Computational Intelligence in Pattern Recognition pp 487-496 | Cite as

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Conference paper
First Online: 18 August 2019

Part of the Advances in Intelligent Systems and Computing book series (AISC, volume 999)

Abstract

This paper deals with an efficient method for the detection and tracking of multiple moving faces from a video sequence. Appropriate detection of multiple faces from a video sequence is a challenging task due to the different combination of noise, illuminations, pose, and locations of the human face which is likely to differ from one frame to another. This paper presents a unique technique for multiple face detection from a video sequence. In this study, our major objective is to detect and track locations of multiple faces from video using elastic window. Additionally, the face tracking system includes the tracking of face motion. Firstly, for each pixel, local entropy is calculated by considering a 3×3 window for detecting the face edges. Subsequently, Gaussian filtering technique is used to eliminate the undesired edges. In this context, it may be noted that a video frame passes through a number of preprocessing steps in order to eliminate the background noise to realize the thin binary image consisting of face boundaries. The human face from video sequences can be tracked by calculating the scalar and vector distances of four corner points between two adjacent frames. The movement of corner points represents the position and location change of the face in the upcoming frame. The presented method has been tasted on several video database and obtained efficient detection and tracking of multiple faces from the video sequences.

Keywords

Heterogeneous Decomposition of Predictive Modeling Approach on Crin Dataset Using Machine Learning

International Conference on Innovation in Modern Science and Technology

ICIMSAT 2019: Intelligent Techniques and Applications in Science and Technol 1004-1012 | Cite as

- Anupam Mukherjee (1) Email author (anupamsit@gmail.com)
- Anupam Ghosh (2)

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2. Department of Computer Science and Engineering, Netaji Subhash Engineeri College, , Kolkata, India

Conference paper
First Online: 03 March 2020

Part of the Learning and Analytics in Intelligent Systems book series (LAIS, volu 12)

Abstract

Substantial increase in criminal activities has been directly affecting socio-economical development and quality of life. Predictive crime data analysis is one of the challenging tasks in the field of data analysis, where machine learning algorithm plays a significant role. In this paper, machine learning techniques are applied to a crime dataset for predicting features that affect the pattern of crime occurrence. Decomposition method has used to split the large dataset into sub-dataset in order to increase the accuracy rate. In this work, we used different supervised classification machine learning techniques to predict crime incident by resolution, depending on its feature attributes. Different classification techniques are used like Naïve Bayes, Generalized linear model, Binary Logistic Regression, Decision Tree, Random Forest, Gradient Boost. Results of different algorithms have been compared and effective approach has been discussed. The average prediction accuracy of these machine learning approaches is approximately 86%.

Keywords

Supervised learning Unsupervised learning Naïve Bayes Generalized linear model Regression Decision tree Random forest Gradient Boost

Rotational Cryptographic Technique (RCT)

International Conference on Innovation in Modern Science and Technology

ICIMSAT 2019: Intelligent Techniques and Applications in Science and Technol
150-156 | Cite as

- Debajyoti Guha (1) Email author (debajyoti.aec@gmail.com)
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3. Department of CSE, University of Kalyani, , Kalyani, India

Conference paper
First Online: 03 March 2020

Part of the Learning and Analytics in Intelligent Systems book series (LAIS, volu
12)

Abstract

A Security scheme based on Block Cipher is being designed where the Encoding and Decoding be prepared using Modular Adding, Rotational Shift operation and binary XNOR operation. The original message is stream of bits, & be presumed to be isolated into an amount of blocks having s bits in each of the them, where s be power of 3 (e.g. 3, 9, 27, 81, 243). An amount of 0's be added at the MSB location of the stream for constructing whole numeral of bits odd in every block. For getting the cipher text the entire operation is done in two phases. In the first phase modular adding is done on neighboring blocks taking modulus of adding be 2^s. The amount restores the subsequent block, 1st block remnants unmoved. At the time of summing up, carry turned beginning the MSB be rejected. In the next phase left and right bit rotation are applied on the output stream and logical XNOR was executed on the result to get the cipher text. The technique be employed on blocks with changeable dimensions from 3 to 3^n. For decryption, the order of XNOR operation & rotational shift will be reversed and modular decryption will be adopted.

Keywords

Encoding Decoding Secret message Block cipher
Rotational cryptographic technique

Proceedings of the Third International Conference on Microelectronics, Computing and Communication Systems pp 161-170 | Cite as

Quantum-Confined States of Electrons in Semiconductor Quantum Ring Under Crossed Electromagnetic Field

Authors Authors and affiliations

Arpan Deyasi ✉, Swapan Bhattacharyya

Conference paper
First Online: 24 May 2019

504 Downloads

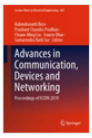
Part of the Lecture Notes in Electrical Engineering book series (LNEE, volume 556)

Abstract

Quantum-confined states of electrons inside quantum ring-like structure have been analytically investigated subjected to crossed electromagnetic field in order to study the effect of field quantization. Schrödinger equation without considering time-dependency factor is solved with boundary conditions based on the cylindrical geometry of the structure, and lowest two orders Bessel functions are considered for the evaluation of electron energy states. Result reveals that while perpendicular electric field lowers the energy subbands, parallel magnetic field makes the opposite effect; thus creating an interesting trade-off situation. The result is weighted against with that acquired independently in absence of electric field and magnetic field respectively for identical dimensions. The present work reflects this energy optimization by simultaneous tailoring of both the fields in order to obtain absorption and emission spectra.

Keywords

Crossed field Quantum ring Eigenergy Cylindrical geometry Field quantization



International Conference on Communication, Devices and Networking
ICCDN 2019: Advances in Communication, Devices and Networking pp 501-506 | Cite as

Estimation of Gain Enhancement of Circular Sector Microstrip Antenna with Air Substrate

Authors Authors and affiliations

Sudip Kumar Ghosh, Abhijyoti Ghosh, Subhradeep Chakraborty, L. Lolit Kumar Singh, Sudipta Chattopadhyay

Conference paper
First Online: 28 July 2020

Part of the Lecture Notes in Electrical Engineering book series (LNEE, volume 662)

Abstract

A quick hand estimation of gain enhancement with air substrate in a circular sector microstrip antenna (CSMA) has been presented in paper. The standard gain estimation process has been carried out with 90° CSMA (air substrate) in comparison with conventional CSMA (PTFE substrate). Around 2.8 dB gain improvement has been achieved.

Keywords

Circular sector microstrip antennas Air substrate Gain enhancement Radiation patterns

References

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Google Scholar

PP-57

Studies on the Dielectric and Electrical Conductivity of Newly Synthesized Orthoconic Antiferroelectric Liquid Crystalline Materials

Shantiram Nepal[1], Anindita Sinha[2], Sarmistha Mondal[2], Banani Das[1*], Malay Kumar Das[3] and Michal Czerwiński[4]

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Abstract

Dielectric spectroscopy [1, 2] and electrical conductivity measurement has been reported on three recently formulated pure liquid crystal compounds, namely Compound A, Compound B and Compound C having SmA*, SmC* and SmC_A* phases, in the frequency range of 40Hz–25MHz. Several dynamics of the relaxation processes i.e., low frequency P_L mode and high frequency $P_H$mode in the SmC_A* phase, Goldstone mode in SmC* phase and Soft mode in SmA* phase have been observed. In the SmC_A* phase of Compound A, two modes of low dielectric strength ($\Delta\varepsilon$) of ~ 1.2 (P_L mode) and ~ 2.4 (P_H mode) are observed. Mode $\Delta\varepsilon_1$ is weaker than mode $\Delta\varepsilon_2$ which is visible over the entire temperature range of the SmC_A* phase. The fluctuation in the azimuthal angle of molecules i.e., Goldstone mode in the SmC* phase contributes towards the maximum value of the dielectric strength in the SmC* phase, which is around 180 in Compound B and 220 in Compound C. The relaxation frequency decreases with decrease in temperature in both the modes of the SmC_A* phase obeying Arrhenius behaviour while the relaxation time increases; this may be accounted for due to the increase in viscosity of the liquid crystal materials with decreasing temperature. The electrical conductivity [3] is maximum in the SmC* phase due to the high dipole moment, however it decreases sharply, attains a low value and remains independent of temperature in the SmC_A* phase, indicating that the conductivity is strongly related to the arrangement of the

molecules within the phase. These materials with wide antiferroelectric range and low relaxation times are promising materials for preparation of new mixtures for fast switching liquid crystal display devices.

Acknowledgement

We gratefully acknowledge financial support from the Department of Science and Technology, New Delhi [Project No: EMR/2016/005001].

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[2] Khushboo et al. (2017) Int. Ferroelectrics, **184** 192.
[3] J. A. Naser (2016) IJAC **12** 499.

PP-58

Electro-Optical and Dielectric Properties of Chiral Ferroelectric Monomers

Shantiram Nepal[1], Sarmistha Mondal[2], Anindita Sinha[2], Banani Das[1*], Malay Kumar Das[3] and Michal Czerwiński[4]

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Abstract

Newly synthesized two chiral ferroelectric monomers showing paraelectric SmA* and ferroelectric SmC* phase has been explored by means of dielectric and electro-optic measurements. The variation of spontaneous polarization, relaxation time, torsional bulk viscosity, dispersion and polarization anchoring coefficients [1] with respect to temperature has been reported in the entire mesomorphic range. Additionally, the dielectric spectra [2] i.e., the complex permittivity (both real and imaginary parts) have been determined as a function of frequency and temperature. Both the monomers are found to possess negative dielectric anisotropy. Measurements shows low relative permittivity ε' with a very small value of the dielectric loss in both the SmC* and SmA* phases. Relaxation modes *i.e.*, the Soft Mode is observed in the vicinity of the SmA*-SmC* transition temperature. The Goldstone Mode appears below 65 °C temperature in the SmC* phase. The results obtained have been discussed in the light of the applicability of these fast switching negative dielectric anisotropy materials as chiral dopants in ferroelectric and anti-ferroelectric liquid crystal mixtures [3]. The low values of the relative permittivity and dielectric loss makes these materials good candidates for application in signal processing device and spatial light modulators [3].

PP-57

Studies on the Dielectric and Electrical Conductivity of Newly Synthesized Orthoconic Antiferroelectric Liquid Crystalline Materials

Shantiram Nepal[1], Anindita Sinha[2], Sarmistha Mondal[2], Banani Das[1*], Malay Kumar Das[3] and Michal Czerwiński[4]

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Abstract

Dielectric spectroscopy [1, 2] and electrical conductivity measurement has been reported on three recently formulated pure liquid crystal compounds, namely Compound A, Compound B and Compound C having SmA*, SmC* and SmC_A* phases, in the frequency range of 40Hz–25MHz. Several dynamics of the relaxation processes i.e., low frequency P_L mode and high frequency $P_H$mode in the SmC_A* phase, Goldstone mode in SmC* phase and Soft mode in SmA* phase have been observed. In the SmC_A* phase of Compound A, two modes of low dielectric strength ($\Delta\varepsilon$) of ~ 1.2 (P_L mode) and ~ 2.4 (P_H mode) are observed. Mode $\Delta\varepsilon_1$ is weaker than mode $\Delta\varepsilon_2$ which is visible over the entire temperature range of the SmC_A* phase. The fluctuation in the azimuthal angle of molecules i.e., Goldstone mode in the SmC* phase contributes towards the maximum value of the dielectric strength in the SmC* phase, which is around 180 in Compound B and 220 in Compound C. The relaxation frequency decreases with decrease in temperature in both the modes of the SmC_A* phase obeying Arrhenius behaviour while the relaxation time increases; this may be accounted for due to the increase in viscosity of the liquid crystal materials with decreasing temperature. The electrical conductivity [3] is maximum in the SmC* phase due to the high dipole moment, however it decreases sharply, attains a low value and remains independent of temperature in the SmC_A* phase, indicating that the conductivity is strongly related to the arrangement of the

International Conference on Innovation in Modern Science and Technology
ICIMSAT 2019: Intelligent Techniques and Applications in Science and Technology pp 960-967 | Cite as

Modified Boost Converter for Increased Voltage Gain Applicable for Multiple Renewable Source

Authors Authors and affiliations

Aamir Haider, Rubi Kumari, Moumi Pandit, K. S. Sherpa

Conference paper
First Online: 03 March 2020

Part of the Learning and Analytics in Intelligent Systems book series (LAIS, volume 12)

Abstract

The Design of a new step up DC-DC converter is proposed in this paper which provides better voltage gain than conventional converter. The proposed converter has the advantages of simple structure with single switch and extended voltage gain. The design and operation of the

International Conference on Innovation in Modern Science and Technology

ICIMSAT 2019: Intelligent Techniques and Applications in Science and Technology pp 173-187 | Cite as

Integration of Solar and Wind Energy for Uninterruptible Power Supply

Authors Authors and affiliations

Rubi Kumari, Shreya Shree Das, Subhojit Roy

Conference paper

First Online: 03 March 2020

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International Conference on Innovation in Modern Science and Technology

ICIMSAT 2019: Intelligent Techniques and Applications in Science and Technology pp 173-187 | Cite as

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Conference paper
First Online: 03 March 2020

Part of the Learning and Analytics in Intelligent Systems book series (LAIS, volume 12)

Abstract

Now days electricity has become the most demandable thing for the human beings. Due to continuous depletion of the conventional energy resources the demand for the use of nonconventional energy resources has increased. In the present paper we have used non-conventional energy resources i.e. solar energy and wind energy for generating uninterrupted power supply for the consumers. This paper comprises of combination of two sources of energy that will provide uninterrupted power supply to the system. Solar panels and wind turbines together have been used for converting the respective energies to the electrical energy. In this paper generation of electrical energy by combining two non-renewable sources at minimal cost and by not affecting the natural environment.

Keywords

Hybrid Conventional Non-renewable energy resources

References

1. Ingole, A.S., Rakhonde, B.S.: Hybrid power generation system using wind energy and solar energy, Department of Electrical Engineering, DES's COET, Dhamangaon. Int. J. Sci. Res. Publ. **5**(3), 1–4 (2015)

International Conference on Innovation in Modern Science and Technology

ICIMSAT 2019: Intelligent Techniques and Applications in Science and Technology pp 516-523 | Cite as

Load Frequency Control of a Thermal-Wind Integrated Power Generating System with IDD Controller

Authors Authors and affiliations

Indrajit Koley, Asim Datta, Goutam Kumar Panda

Conference paper

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Confidence Belief Function Weighted Parallel Rank-level Fusion for Face recognition

Aniruddha Dey ; Sourav Kumar Dey ; Alok Kumar Roy ; Manas Ghoslr ; Satadal Chakraborty ; De… All Authors

Abstract: In this paper, proficient feature extraction techniques using efficient neural networks (NN) with evidence theory for face recognition are presented. This approach is est... **View more**

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In this paper, proficient feature extraction techniques using efficient neural networks (NN) with evidence theory for face recognition are presented. This approach is established to reduce the computation periods required by these NN. Evidence theory based single or multi biometric fusion methods have established promising performance, but they cannot handle the uncertainty appropriately, suggesting that further improvement of the performance of single biometric authentication systems. Conventional ranking is upgraded, using some associations among the outputs (belief confidence factors) of a classifier. Then, the final result is achieved by fusing results from the combined classifier output (belief confidence factors) with evidence theory. The face database usually severely affected by various degradations such as, illumination, noise and pose variations etc. which affects the overall recognition accuracy. The outcome establishes that the proposed rank-level fusion method attains superior recognition accuracy than other feature extraction and other related rank level fusion approaches.

Published in: 2019 3rd International Conference on Electronics, Materials Engineering & Nano-Technology (IEMENTech)

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First Online: 18 August 2019

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Keywords

Dr. S. Dey has vast experience as executive in corporate world and as senior faculty member of a renowned Management and Engineering College of North Bengal. He has written a number of articles on various management related issues in reputed international and national journals. He is also involved in providing consultancy services to various large and small organizations for quite some times now.

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For BBA Students

Dr. Shuvendu Dey

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Distribution & Retail Management

Dr. Shuvendu Dey

Distribution & Retail Management

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A Study on Social Media Marketing in India

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Introduction

It is imperative for companies to understand the purchasing decisions when they market their products and services as the consumer buying behaviour has a direct effect on the decisions made by companies in adopting the appropriate marketing strategies. Popular success of social media platforms (SMPs) such as Facebook, Instagram, Linkedin, Twitter, Flickr, TripAdvisor caught the attention of marketers globally. Marketers started looking at social media as a new avenue to create profitable relationships with consumers. Researchers suggest that the online environment can provide brands with structural asset, scale and process advantages in terms of a proactive devoted customer base, online consumer data and new campaign concepts.

Recently, brands have started allocating a significant portion of their marketing budgets to social media marketing (SMM). Despite the exponential growth of SMM, certain issues remain unresolved. Marketers are still unsure of how to measure the impact of their social media strategy and its contribution to the bottom line, and how to use social media to build and sustain value-creating relationships with their customers. Furthermore, social media research is still in its nascent stage and yet to evolve as a separate marketing sub-discipline.

Social media is changing the world, and there is no going back. Technological and demographic trends are likely to further accelerate the impacts of social commerce on organizations and their brands in coming years. The new game therefore favours the brave. The winners will be those organizations and brands that seek out the commercial opportunities presented by social commerce and embrace the changes required to adapt to the changing norm around them.

With a population reaching 1.347 billion, India is considered the second most densely populated country in the world. This sheer number guarantees that the country holds so much potential and can provide a lot of opportunities for both foreign enterprises and local companies alike. Despite the country's low current internet penetration rate, India's social market is anticipated to grow rapidly in the coming years. This growth makes the country attractive to business aiming to explore the region. However, there are also several risks associated with penetrating the Indian market.

Role of Marketing in Tribal Entrepreneurship: A Study

Arunjyoti Bose
Entrepreneurship Development Institute of India
Ahmedabad
Shawnedu Dey
Siliguri Institute of Technology
Siliguri

Abstract

Tribal entrepreneurship mainly considers ways and means of how to best utilize the resources available to the tribal community and contribute to their overall development. Strategic utilization further helps in growth of the resource base and taking advantage of the available opportunities for the development of the tribal community. This, in turn, helps generate better employment as well as entrepreneurial opportunities for the broader tribal community. The factors of marketing play an inseparable part in strategic utilization of resources in facilitating the tribal enterprises and act as a determining factor for the growth of these organizations. The present study, with the help of existing literature, explores the factors of marketing that are important for the development of tribal-run enterprises in the Indian context.

Keywords: tribal entrepreneurship, marketing factors, tribal community development

For decades, the Government of India has been trying to provide social justice to the tribal people, who make up the weakest section of the population, by uplifting their socio-economic status. The tribal community has long been the victim of administrative neglect from the ecological, economic and educational aspects. They represent the epitome of India's poverty and, even though they are the original inhabitants of this land entitled to all the benefits and amenities offered to the citizens by the state, are in all practicality deprived of most of them. Accessible means of livelihood, food security, and better standard of life are some of the focus areas of tribal development missions. But, in spite of such endeavors, the results so far have been far off from the desired achievements.

There are numerous livelihood missions functioning in various tribal regions of the country that opens up avenues for comparative studies to better comprehend the various roles played by the tribal people as harbingers of change in their lives. The findings and inferences of these studies can enrich the knowledge base of the policy makers, practitioners, and academics and provide fresh insight to move up to the twin challenges of poverty reduction and livelihoods enhancement.

Literature Survey

Entrepreneurs take great responsibility to build the economy of the country. Their contribution is reckoned in employment generation, wealth generation, creating products, and tax generation for governments. A strong entrepreneurial community is needed for the developing countries to prosper despite their rich resource base. Hence, entrepreneurship happens to be a multidimensional concept (Kuratko, 2017a). The term was originally French, first used in 1725, and was devised by the Irish-French economist, Richard Cantillon (1680–1734) (https://yourstory.com/mystory/what-is-entrepreneurship).

A Study of Home Stay based Tourism Entrepreneurs in Darjeeling

Amrijyoti Barua
Entrepreneurship Development Institute of India
Ahmedabad
Debasis Bhattacharya
University of North Bengal
Siliguri
Shuvendu Dey
Siliguri Institute of Technology
Siliguri

Abstract

This article proposes elements for an answer by inquiring into the customer satisfaction level in the context of homestay tourism in Darjeeling. In this case, the article deduces the initiatives of homestay entrepreneurs and how they organize to serve the tourists. The relevance and importance of the various parameters are put under scanner and some broadening of the analysis is proposed on grounds of visitor's satisfaction. A descriptive methodology has been employed by personally administering a questionnaire to the target respondents. Various descriptive measures, application of Factor Analysis, and OLS have been employed to process the data. The findings of the study reveal that customer satisfaction can be explained by considering a few important variables. The results signify that there are scopes for further improvement of the service provided to the tourists by the homestay entrepreneurs.

Keywords: homestay, tourism, customer satisfaction, entrepreneurs.

Tourism is now considered as an industry providing various related services and different types of tourism have emerged providing livelihood opportunities to the rural underprivileged people at the bottom of the pyramid. As pointed out by Chang (2011), entrepreneurs are playing a pivotal role in generating opportunities for leisure and recreational facilities to a cross-section of travelers all over the globe. The development of tourism to a considerable extent depends on the performance of efficient entrepreneurs. As defined by Khanka (1999), entrepreneurs in the field of tourism are persons involved in producing and offering tourism products. It has now been universally accepted that rural tourism is an attractive opportunity to provide opportunities for tourists to enjoy the beauty, serenity, and tranquility of the pristine environment. The credit obviously goes to the budding entrepreneurs to market unexplored destinations (Koh, 2014). Homestay as a special means of tourism is gaining recognition in India in the current years although it is considered a popular tourism in various South Asian countries. Malaysia, Thailand, and Indonesia have restored this method of tourism to generate additional revenues for rural people who do not have alternative income generation opportunities. The rapid arrival of tourists in diverse natural ambiance and the inclination of tourists to stay under the natural environment, the homestay tourism has become a growing market segment which is virtually distinct from traditional tourism services provided by homestay operators. The meaning of homestay tourism has a diverse connotation in different countries. Researchers have given the different definition of homestay tourism according to their standpoint. According to the view of Hamzah and Ismail (2013) homestay is considered as a variety of accommodation where tourists find an

A Case Study on On-Street Parking Demand Estimation for 4-Wheelers in Urban CBD

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A Case Study on On-Street Parking Demand Estimation for 4-Wheelers in Urban CBD

Saptarshi Sen[1], Mokaddes Ali Ahmed[2] and Debasish Das[3]

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Abstract—*Lack of parking policy has become one of the most important aspects of transportation. The parking issue is trending all around the world especially in central business district (CBD). Metropolitan cities are affected mainly by this problem. Kolkata is one of the largest and oldest metropolitan cities in India which is also affected by the parking problems. Insufficient off-street parking facilities and tendency to park the vehicles near to the destination lead to high parking demand. The vehicle ownership and the poor quality of transit system are also the reasons for increase in demand. These factors result in reduction of the main carriageway width, decrease in flow speed and creates unnecessary congestion to traffic flow which creates cruising of parking. Proper parking management policy should be implemented to control the demand. In this study, two CBDs- Gariahat (one of the largest shopping area) and Dalhousie (one of the largest office area) have been selected as the case study area. In this study a parking demand model is developed to estimate the parking demand. Parameters like age, vehicle ownership, parking duration, annual family income, distance between origin and destination are incorporated to generate the demand model. Some field surveys like in-out survey and questionnaire survey were conducted to obtain the data for above mentioned parameter. The parking demand model is generated by linear regression analysis in SPSS. Further the estimated demand is compared with the existing supply.*

Keywords*: CBD area, accumulation profile, parking supply, parking fees, parking duration, parking demand, SPSS.*

1. INTRODUCTION

Over the last decade, a noticeable change has been found in the growth of urbanization in India. As the population growth is increased day to day, the use of transportation system is also increasing. But the urban transport problems degrading due to lack of organized urban road network, inefficient transit system. The economic and commercial growths are mainly observed in the core of the urban area i.e., CBD. A good transportation system must be implied to obtain the mobility in traffic movement. The on-street parking is one of the main reasons for cruising of parking in CBDs which creates congestion and resists the traffic flow. Due to the convenience of the people (in terms of availability of all needs), they prefer to visit CBDs to fulfill their requirements. The parking issue is prominent mainly in metropolitan cities. So, a metropolitan city, Kolkata is chosen as the case study area for this study.

Kolkata is one of the largest and oldest metropolitan cities in India. Due to dense population and dense industrialization, Kolkata CBD areas are also facing the same transport problems. The land use pattern of Kolkata is mainly concentrated in CBDs. Due to the less scattered land use pattern in other part of the city the maximum parking demand is generated in CBD. The growth of Kolkata will staged if we fail to manage the traffic movement of CBDs. As the parking issue is the main reason for resisting the traffic movement, the study is focused to manage the parking demand.

2. OBJECTIVE

The objectives of this study:

a. To generate the parking demand model and
b. To compute the parking demand and compare it with the present supply.

Many research works have been done earlier. A number of research papers are studied to fulfill the objectives. The findings of some of the related papers are briefly described in section 3.

3. LITERATURE SURVEY

Many research works on parking have already been done in past few decades. A number of papers have been studied to get the knowledge about the topic of parking demand analysis. The brief knowledge of the studied papers is discussed in the next few paragraphs.

In the year 2000, simple parking demand models were developed in Hong Kong by S. C. Wong, C. O. Tong, Wilkie C. H. Lam and Rayson Y. C. Fung [1] to calculate the future parking demand of the study area. The model was developed assuming linear and additive relation of off-street parking with land use variables.In 2001, role of parking price and supply in parking demand was investigated in Sydney CBD area by David A. Hensher, Jenny King[2]. They developed nested logit

Chicago Crime Data Analysis Using PIG in Hadoop

Anupam Mukherjee ; Sourav De ; Siddhartha Bhattacharyya ; Jan Platos All Authors

Abstract: The need for analyzing the different crime dataset has significantly increased over the past few decades. It is necessary to detect the wide variety of crimes and the cor... **View more**

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Abstract:

The need for analyzing the different crime dataset has significantly increased over the past few decades. It is necessary to detect the wide variety of crimes and the corresponding place of occurrences accurately. Government bodies throughout the world maintained Open Data initiatives, which is a large collection of heterogeneous dataset. This enables the government agencies to maintain the law and order of the society. The prime objective of this paper is to analyze the Chicago crime dataset to extract the significant crime information over the years. The proposed analysis is performed to bring out the crime information depending on some predetermined criteria, e.g. total crimes of different types, narcotic crime cases, an offense involving children, analysis of hourly theft cases and location identification where the major theft cases have occurred. The proposed analysis is performed in fully distributed Hadoop cluster. Moreover, we have extracted crucial minuscule statistics on theft-related criminal activities and their latitude or longitude.

Published in: 2018 Fourth International Conference on Research in Computational Intelligence and Communication Networks (ICRCICN)

Date of Conference: 22-23 Nov. 2018 **INSPEC Accession Number:** 18721943

Date Added to IEEE *Xplore*: 23 May 2019 **DOI:** 10.1109/ICRCICN.2018.8718725

ISBN Information: **Publisher:** IEEE

Mukherjee, Anupam & De, Sourav & Bhattacharyya, Siddhartha. (2019). Indian Crime Data Analysis in Hadoop Framework. All over the world, different types of crime is happening and the graph of the occurrence of crime is increasing at a staggering pace. The Open Data initiative has already been taken by the government of that country and they have started to store the huge amount of crime related heterogeneous data. Crime data analysis is a significant matter for the government of the country to maintain safety and security among the citizens. The paper Indian crime information dependent on some predefined conditions. In this regard, it is to be noted that our proposed analysis efficiently works on fully distributed multi-node Hadoop cluster. Therefore, it redresses the shortcomings of most of the state-of-the-art techniques, which mainly works on pseudo distributed mode. Furthermore, our proposed method of analysis extracts a large amount of meaningful information than the existing methods. To validate our claim we have compared our analysis with an existing work and have got some satisfactory results. In case of women related crime and the state wise crime activities of India, the proposed method of analysis outperformed the existing methods.

2018 | OriginalPaper | Chapter

User Authentication with Session Key Interchange for Wireless Sensor Network

Authors: Prasanta Kumar Roy, Krittibas Parai, Abul Hasnat

Publisher: Springer Singapore

Published in: Methodologies and Application Issues of Contemporary Computing Framework

Abstract

Secure user authentication is an indispensable issue in wireless sensor network (WSN) as the sensor nodes are deployed in public environment. In 2014, Nam et al. proposed their scheme in this regard. This manuscript highlights several limitations of Nam et al. protocol such as denial of service, no login phase verification, clock synchronization problem, improper mutual authentication, key-compromised impersonation and man-in-the-middle attack, and unverified password update phase. Hence, we put forward an efficient two-factor user authentication with session key interchange protocol for WSN (ASKI-WSN) based on elliptic curve cryptography (ECC) to overcome these limitations. The proposed ASKI-WSN scheme is informally verified under several security threats and formally validated using widely accepted automated validation of Internet security protocols and applications (AVISPA) tool. Finally, the performance analysis of our ASKI-WSN scheme in terms of security and computation cost shows its efficiency for practical applications as compared to some existing protocols.

A new enhanced secure anonymous communication with authentication and session key agreement in global mobility network

Publisher: IEEE

Prasanta Kumar Roy ; Krittibas Parai ; Sathi Ball ; Bipin Kumar All Authors

Abstract: Recently, several protocols have been proposed to accomplish user authenticity with proper session key establishment in Global Mobility Network. Unfortunately, some of th... **View more**

Metadata

Abstract:
Recently, several protocols have been proposed to accomplish user authenticity with proper session key establishment in Global Mobility Network. Unfortunately, some of them still suffer from various security threats and high computational complexity. This article demonstrates a new enhanced two-factor authentication scheme for secure anonymous communication to mutually authenticate the communicating parties and to establish a proper session key between them. The major contributions of this article are 1) to achieve all kind of security goals and 2) to effectively reduce the computational complexity. The underlying construction is developed using Elliptic Curve Cryptography (ECC) along with light-weight processes to ensure the resistibility against well-known security threats and improved computational complexity. The protocol is implemented using HLPSL and formally validated using AVISPA to ensure that it has the ability to withstand several attacks. We have also compared the computational complexity of our protocol with some existing protocols to prove its efficiency.

Published in: 2017 Third International Conference on Research in Computational Intelligence and Communication Networks (ICRCICN)

Date of Conference: 3-5 Nov. 2017 **INSPEC Accession Number:** 17452791

An Approach Towards Design and Analysis of a Non Contiguous Block Cipher Based Cryptographic System Using Modular Arithmetic Technique (NCBMAT)

International Conference on Computational Intelligence, Communications, and Business Analytics

CICBA 2018: Computational Intelligence, Communications, and Business Analytics pp 388-401 | Cite as

- Debajyoti Guha (1) Email author (debajyoti.aec@gmail.com)
- Rajdeep Chakraborty (2)

1. Department of CSE, Siliguri Institute of Technology, , Siliguri, India
2. Department of CSE, Netaji Subhash Engineering College, , Kolkata, India

Conference paper
First Online: 26 June 2019

Part of the Communications in Computer and Information Science book series (CCIS, volume 1031)

Abstract

In this article a new Cryptographic System based on Modular Arithmetic using block ciphers has been considered. The original data which is a stream of bits, is assumed to be divided into a number of blocks & each block contains m bits, where m is anyone of (3, 9, 27, 81, 243). The technique is based on the concept of data redundancy. A Number of redundant zeros will be appended at the MSB of bit stream to make total number of bits odd in each block. The binary addition has been made between first and the ultimate block taking modulus of addition as 2^m. The sum replaces the content of ultimate block, first block remains unaltered to get the cipher text. In the next step the binary addition has been made between the ultimate block and the second block and the result replaces the second block. The technique proposed here involves operations on non-contiguous blocks (unless only two blocks are left which are adjacent to one another). In any two consecutive operations, one block is common, which makes the encryption unpredictable and thereby enhances security. The carry generated (if any) out of the MSB is discarded. The technique is applied on blocks with varying sizes from 3 to 3^n. The modulo subtraction technique is adopted for decryption to get back the plain text.

Keywords

2018 | OriginalPaper | Chapter

An Approach Towards Design and Analysis of a New Block Cipher Based Cryptographic System Using Modular Encryption and Decryption Technique (MEDT)

Authors: Debajyoti Guha, Rajdeep Chakraborty, Jyotsna Kumar Mandal

Publisher: Springer Singapore

Published in: Social Transformation – Digital Way

Abstract

In this article a new Cryptographic System based on Block Cipher has been planned where the Encryption and Decryption are done based on Modular Arithmetic. Hence the title of the article is suggested as Modular Encryption and Decryption Technique (MEDT). The plain text message which is a stream of bits, is assumed to be separated into a number of blocks & each block contains m bits, where m is anyone of (3, 9, 27, 81, 243). Number of zeros will be appended at the MSB of bit stream to make total number of bits odd in each block. The binary addition has been made on contiguous blocks taking modulus of addition as 2^m. The sum replaces the second block, first block remains unaltered. Similar operation will be continued for second and third blocks and so on till all the blocks are exhausted to get the cipher text. During summation the carry generated (if any) out of the MSB is discarded. The technique is applied on blocks with varying sizes from 3 to 3^n. The modulo subtraction technique is adopted for decryption to get back the plain text.

Most Influential Node Selection in Social Network using Genetic Algorithm

Publisher: IEEE

Mithun Roy ; Indrajit Pan All Authors

Abstract: Goal of Influence Maximization problem is to find a top-k powerful nodes as a seed set which has a maximum influence with respect to a propagation model. This is NP-hard ... **View more**

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Abstract:
Goal of Influence Maximization problem is to find a top-k powerful nodes as a seed set which has a maximum influence with respect to a propagation model. This is NP-hard in nature. Most of the related algorithms are based on greedy methods, which are computationally expensive. Any exhaustive search algorithm can't discover the good solution in a sensible time. In this paper we introduce a performance oriented algorithm for solving the influence maximization problem using Greedy inspired Genetic Algorithm. We have observed that the performance of proposed algorithm is outperforming similar existing algorithms for maximizing influence Spread.

Published in: 2018 Fourth International Conference on Research in Computational Intelligence and Communication Networks (ICRCICN)

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Conference Location: Kolkata, India

Chapter

Effect of Surface-to-Volume Ratio on Eigenenergy in Quantum Ring

July 2018

DOI:10.1007/978-981-10-3953-9_8

In book: Industry Interactive Innovations in Science, Engineering and Technology (pp.71-78)

Authors:

S. Bhattacharyya
Siliguri Institute of Technology

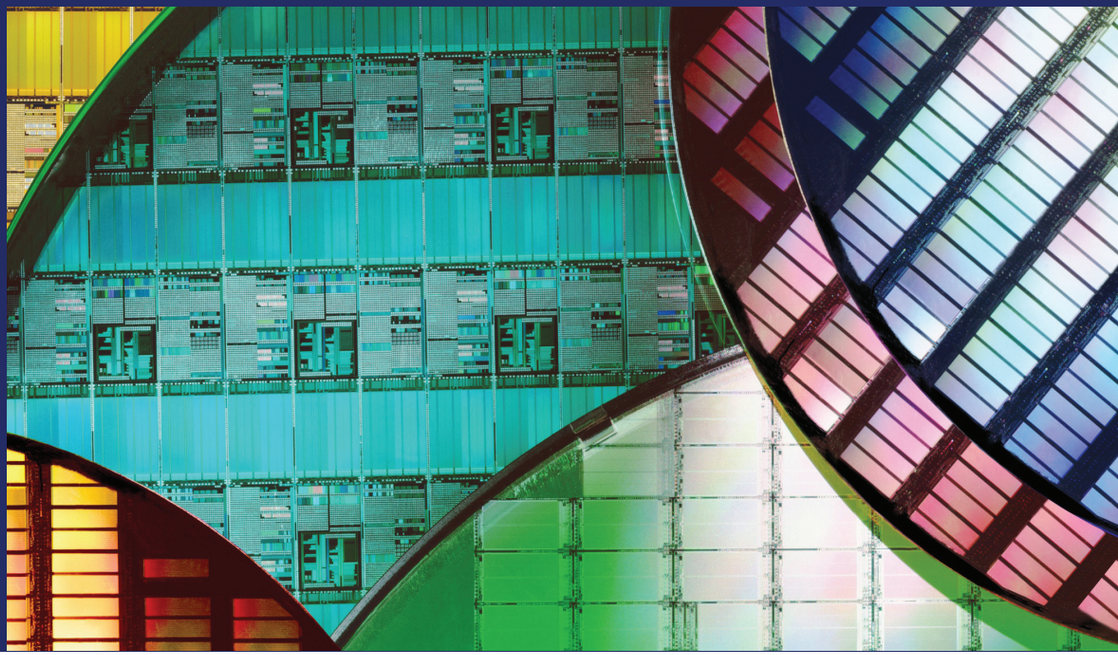
Sourish Haldar

Arpan Deyasi
West Bengal University of Technology

Simulation of larger device structure is difficult due to meshing problem and is too time consuming. So, a small structure is simulated as replica of a larger one to investigate the qualitative features. Higher figures of merit (PVR) may be conveniently realized for the GaInAs/A1InAs system. Constructional features for these diodes are the same as for the GaAs/GaAlAs systems. Only GaInAs replaces GaAs and AlInAs replaces GaAlAs. The improvement for this system is essentially due to a larger value of the barrier potential and lower value of the effective mass in the well.Further improvement in device characteristics may achieved by using AlAs barrier layers in place of A1InAs barriers. From the simulated result, it is found that PVR is very high than GaInAs/A1InAs based RTD. But NDR appears at higher voltages. To achieve PVR at lower voltage, barrier thickness must be increased or well thickness must be decreased. By introducing InAs layer as well material the higher voltage problem associated with AlAs barrier can be minimized. This increases the PVR and NDR occurs at lower voltages. But the dimension of InAs layer must be within a limit, otherwise PVR can't be achieved at desired.

Both authors are working as Assistant Professor in the ECE Department of Siliguri Institute of Technology, Siliguri. Research interests of Banasree Das include testing of Mixed Signal circuits and simulation of nano materials. Research interests of Manas Parai include the area of Embedded System and VLSI Design.

978-613-8-23601-6



Banasree Das (Parai)
Manas Parai

Characteristic of RTD for Different Parameters and Material Properties

Influence on Characteristics of RTD due to variation of different Parameters and Material Properties

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An Investigation into the Equivalnce of Radiation Characteristics of 90° Circular Sector Microstrip Antenna vis-à-vis Circular Microstrip Antenna

Sudip Kumar Ghosh ; Subhradeep Chakraborty ; Sanjay Kumar Ghosh ; Abhijyoti Ghosh ; Sudipta Chattopadhyay ; L.L. K. Singh All Authors

Abstract:
In this work, authors have investigated feed-probe influence on radiation characteristics of 90° circular sector microstrip antenna (CSMA). It is observed that by exciting a 90° CSMA with a feed-probe at two different feed-probe positions, two different modes TM_{01} and TM21 can be excited within the antenna structure. The resonant frequencies of these two modes are different but both of these modes have broadside radiation patterns in E and H plane. It is also observed that a 90° CSMA resonating at higher order TM_{01} mode has nearly equivalent radiation characteristics with a circular microstrip antenna resonating at dominant TM_{11} mode resonating at nearly same frequency. Therefore, the 90° CSMA becomes a suitable alternative to a circular microstrip antenna.

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Publisher: IEEE

Conference Location: Hyderabad, India

I. Introduction

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Review on Power Quality Issues and Its Solution For Better Electrical Reliability In Power System.

Rubi Kumari[a], Nirban Chakraborty[b] , Shreya Shree Das[c]

[a,b,c]Department of Electrical Engineering, Siliguri Institute of Technology, Siliguri , 734009, India.

Abstract: The demand for the electrical energy has increased at a rapid speed and it is still growing with a fast pace. Due to this there has been a rapid increase in the number of Power Plants. These electrical distributions have led to large losses because of varying load demands, lack of reactive power compensation techniques and many more. The main purpose of improving the power quality in the transmission lines is to provide continuous power at constant sinusoidal voltage and frequency. But, practically the power distribution system comprises of loads which are non-linear in nature and ultimately leads to poor power quality in the system. [1]. This review paper explains about the various sources, causes that leads to poor power quality and its solution in practical life.

1. INTRODUCTION

Due to continuous demand of electric power, the use of semiconductor switching equipment, such as diodes and thyristors rectifiers, has rapidly increased which has resulted in the degradation of the power quality in the transmission lines. The poor power quality issues in large industries have led to invest huge amount of money on voltage distortions, harmonics, short and long term disturbances and many more. The use of linear loads has also resulted in the degradation of the power quality. If the electric supply would be constant with steady values of voltages and frequency then the quality of power is also good. However, in actual practice, varying electricity demands and faults cause disturbances in the electric power system, by deviating from its normal characteristics. Following are reasons for poor power quality in the transmission lines:

i. Due to variation in the supply
ii. Fluctuation in the frequency
iii. When the voltage and current waveforms of the required supply is not constant (i.e. distorted)
iv. Unbalanced loading on the distribution transformers.

Due to increase of these non-linear loads, harmonic component became very significant in the distributed system which led to various problems like distorted voltage waveform, malfunctioning in the system, inaccurate power flow, excessive flow of current and many more. Due to these reasons the efficiency of drawing reactive current has also reduced. [2].

In today's era, the issue of poor power quality has become one of the serious problem for commercial, industrial and domestic consumers. There are appliances used by both commercial or domestic consumers which may not work properly if the voltage level increases or decreases the required value and the chances of damaging the appliances becomes high. This may result in the malfunctioning of the electrical equipment's. In industries, low power quality is one of the serious concerns for automated sensitive production machines [3].

Nomenclature

The Information Technology Industry Council (ITC), Transient Voltage Suppressors (TVSS), Electromagnetic Interference (EMI), Radio Frequency Interference (RFI), Uninterruptible Power Supply (UPS), Constant Voltage Transformer (CVT)

2. MAIN SOURCES, CAUSES AND EFFECTS OF ELECTRICAL POWER QUALITY PROBLEMS:

Power Quality is defined as the any change in voltage, current or frequency deviation that may result in the failure or disoperation of the customer's equipment's. Any Power system should have the capability to provide uninterrupted power supply at smooth sinusoidal voltage without changing the frequency and magnitude. [4].
There are various reasons which lead to degradation of power quality in the transmission lines. Following are the list of causes that leads to poor power quality in the power system:

2.1. Variation of voltage: Voltage variation can be defined as the deviation of voltage from its actual value. This voltage variation can be for short duration i.e. millisecond to seconds or it may take place for long durations also i.e. for more than a minute. The voltage variation which occurs for short duration occurs mostly as voltage spikes, voltage sags or swell whereas the voltage variation for long duration may occur as voltage fluctuations or voltage interruptions in the power systems. This results in either increase or decrease of the voltage magnitude

A.Voltage Sag: Voltage sag is also known as voltage dips. It is basically decrease or reduction of the magnitude of the supply voltage for a short period of time. When the voltage supply is between 0.1 to 0.9 pu of the nominal voltage for at least one minute, then the chances for voltage dip or sag increases at that moment. These voltage dips takes place due to

International Conference on Computational Intelligence & IoT (ICCIIoT) 2018

Comparative Analysis of Different Optimization Techniques in Automatic Voltage Regulator System

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[a,b]*Department of Electrical Engineering, Siliguri Institute of Technology, Sukna, West Bengal-734009, India*

Abstract: Automatic Voltage regulator (AVR) is becoming a very vital tool for controlling the output voltage constant for the synchronous generator in the industries. To design a desired AVR model several controller model has been introduced, but among those PID Controller is the successful one. Now for the past few decades various number of optimization techniques has been proposed for tuning the PID controller and to enhance the stability analysis of the system. But among those proposed techniques some is able to optimize the system as per the requirement. Here in this paper we have present a relative analysis of the results of the (mainly the transient parameters result) different optimization techniques for PID controller tuning. Some of the results for the transient analysis are taken for different gain values of PID Controller for the same optimization techniques. This paper gives us a very good idea about the different results in transient behaviour for different optimization techniques, which is very much helpful for further studies regarding this field.

1. Introduction

Electricity is a very huge part of our day to day activities. We use many electrical types of equipment in our daily life. However, that equipment's are very sensitive to voltage fluctuations. Like that equipment's the power generators are also very sensitive towards the voltage fluctuations. In power generation process the main objective of the synchronous generator is to maintain an almost constant voltage in the load side, which itself is a very puzzling job in electrical power generation system. As the supply voltage is case of alternator has to remain constant, so to maintain a constant voltage in the output side the excitation voltage have to vary accordingly to meet the objective. Automatic voltage regulator (AVR) is a device that varies the excitation voltage as per the requirement.

Regulator is a device that can regulate the value, the first voltage regulator which is used in the industries was electronic regulator in the early of the 20th century, which can regulate the voltage manually as per the need of the load. In the latter half of the 2oth century gradually the automatic voltage (AVR) started to gain its mark in all the different power sectors. AVR mainly has four components they are- Amplifier, Exciter, Synchronous Generator & sensor.[5] Various controllers model has been proposed for the designing a desired AVR Model which can control the excitation voltage. Among those various controlling techniques PID Controlling technique has been found as the most successful one. This controlling technique has been found as the most widespread one in the industries.

Now to tune the gain values of the PID Controller (K_P, K_I, K_D) is a huge time containing and trial and error process, which is unsuitable for the industry because it requires smooth and quick operation, so overcome this problem different optimization techniques has been used for tuning the correct value for the gain parameters of PID controller. Among those optimization methods Ziegler-Nichols (ZN) was the earliest one which was introduced from 1942 as a heuristic approach in PID-tuning. After that in the last few decades several others met heuristic Optimization algorithm techniques has been introduced to optimize the PID controller. Genetic Algorithm (GA), Particle swarm optimization (PSO), Many Optimizing liasions (MOL), Adaptive Particle swarm optimization (APSO), Differential Evolution Algorithm (DEA), Artificial Bee Colony Algorithm (ABC), Linear Quadratic Regulator (LQR), Grasshopper Optimization Algorithm (GOA), Simulated Kalman Filter (SKF) are some of the optimization techniques that has been used recently to get the better stability response of the system. Using these different kinds of algorithm for optimizing the PID controller also improves the transient behavior of the system. [10] Due to the introduction of this algorithms more precise optimization can be possible for the controller which gives us smoother and faster error free (almost) response of the system.

This paper presents a review of some of the popular optimization algorithm for tuning the PID-Controller in the recent decades and discuss about the stability analysis of the system. The continuing part of the paper is presented as follow Section 2 discuss about the modeling of automatic voltage regulator (AVR). Section 3 presents about the PID Controller, In Section 4, different results of the system behavior for different optimization techniques is given and has comparative discussion on those results. Section 5 presents the conclusion part of this paper.

2. Modeling of Automatic Voltage Regulator (AVR)

AVR operates on the principle of feedback control loop. It uses to maintain the terminal voltage of the generator at a constant. In power generation AVR loop is operating with another feedback loop know as Automatic Load Frequency Control (ALFC) which is used to maintain the frequency of the generator at the desired value. [2] Both of the \loop operates simultaneously but their operation never affects the other one. The AVR loop is much faster in operation compare with the ALFC loop because of the smaller time constant block which constitutes it. The simplified AVR block is generally made of five blocks. They are-

i. Controller
ii. Amplifier
iii. Exciter

Spider monkey optimization based cascade controller for LFC of a hybrid power system.

Debasis Tripathy[1]*, B. K. Sahu[2], N. B. Dev Choudhury[1], Subhojit Dawn[3]

[1]Department of Electrical Engineering, NIT Silchar, Silchar, India – 788010
[2]Department of Electrical Enginnering, Siksha 'O' Anusandhan University, Bhubaneswar, India – 751030
[3]Department of Electrical Enginnering, Siliguri Institute of Technology, Siliguri, India – 734009

Abstract: This report proposed a proportional–derivative with filter cascaded with a proportional–integral (PDF-PI) controller optimally design by spider monkey optimization (SMO) algorithm for load frequency control (LFC). Firstly, a commonly used thermal-thermal two area system has been considered to validate the performance of SMO based proportional-integral (PI) controller over recently published PI controller designed with teaching learning-based optimization (TLBO), differential evolution (DE), hybrid bacterial foraging optimization-particle swarm optimization (hBFOA-PSO), BFOA, genetic algorithm (GA) and conventional Ziegler Nichols (ZN). Furthermore, to verify superiority of proposed cascade controller over conventional integral-derivative (ID), PI and proportional-integral-derivative with filter (PIDF) controller in SMO framework, the system extended to a hybrid one by incorporating distributed generation unit and diesel unit in area-1 & area-2 respectively along with thermal generating unit (considering nonlinearities). Additionally, a combination of redox flow battery energy storage system and high voltage-DC is used to improve the dynamic performance of the overall system. Finally, the robustness of the proposed controller verified by applying a random load pattern in area-1.

1. Introduction

In a real scenario, the structure of power system is becoming more complex as because of several coherent areas are interconnected together to provide reliable and stable supply to the consumers. Generally several issues are associated with interconnected power system due to rapid load variations, changes in structure, uninvited disturbances and parameter variation. Consequences of above mentioned issues are real and reactive power imbalance between generation and demand. The power balance between generation and load demand is an important factor to consider for power operation and control, otherwise it will cause deviation in frequency (due to real power imbalance) and voltage (due to reactive power imbalance) from their steady state values. So Load frequency Control (LFC) is a scheme which controls and maintains the change in frequencies (Δf) and change in tie line power flow $(\Delta P_{tie\text{-}ij})$ between area i and j within an acceptable limit as fast as possible by controlling real power. It does so by adjusting generation, corresponding to load demand change through a continuous monitoring of area control error (ACE). As ACE is related to Δf and $\Delta P_{tie\text{-}ij}$ linearly so it is highly essential to bring frequency and tie line power deviations zero for zero ACE (Kundur 2009; Elgerd & Fosha 1970). Modernization and speedy population growth are the major cause of rising load demand. The use of fossil fuels for power generation may lead to their depletion and their cost increment with time. To overcome this issue, many researchers paid their attention to alternative resources (non-conventional) like wind, solar, photovoltaic (PV) etc. This sources can be used individually or in a group as distributed generating (DG) units. Usually, capacity of DG units are comparatively less with respect to conventional generating units, so they are placed nearer to the consumer end for reduction of transmission loss. An extensive study of Literature discloses that substantial volume of work has been reported in the field of LFC for last few years. In (Singh et al. 2013; Hussain et al. 2017) authors reported frequency control of an isolated system considering DG resources. The study of LFC (Pandey et al. 2014) reported for a two area hybrid power system (combination of thermal and DG). A three area hybrid system (thermal and DG) considered (Raju et al. 2017) including generation rate constraint (GRC), whereas area-2 in (Pandey et al. 2014) and area-2 & 3 in (raju et al. 2017) is having only thermal unit. Moreover most important physical nonlinearities like governor dead band (GDB) has not been included in the above works which may degrade the system performance significantly. LFC study for two area comprising of DG unit in area-1 and diesel unit in area-2 along with thermal unit considering both GRC & GDB and the effect of redox flow battery (RFB) and high voltage-DC (HVDC) is yet to be explored.

In past several literatures reported various controller structures and many optimization techniques to select optimal values of controller parameters for enhancing the dynamic performance of the interconnected systems in the field of LFC. The performance of PI controller optimally designed using Bacteria foraging optimization (BFO) technique implemented and compared (Ali et al. 2011) with genetic algorithm (GA) based and conventional Ziegler Nichols (ZN) PI controller for two area thermal-thermal system without considering reheat turbine. The superiority of differential evolution (DE) optimized PI controller verified (Rout et al 2013) over others like BFO and GA based PI for above mentioned system. A hybrid BFO-particle swarm optimization (PSO) algorithm based PI controller introduced in (Panda et al. 2013) to show the dominance over other above cited controllers, then authors extended the work to a three area system. Teaching learning based optimization (TLBO) technique is used (Sahu et al. 2016) for optimal selection of two-degree of freedom (DOF) PID controller parameters. State space representation for LFC study used (Ibraheem et al. 2014) in a realistic power system incorporating AC/DC

A Review on Optimal Placement of FACTS Devices

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Abstract: Now a day, electricity demand is increasing in a huge rate due to the modernization of electrical equipment. In the other hand, due to the restrictions in the construction of new transmission lines, there is a possibility of create congestion in the existing transmission lines. As a result, blackout in the system may occur. To avoid this critical condition, electrical transmission and distribution companies try to develop some mechanism or technique to increase power flow capacity or the thermal limit of the existing system. For the said purpose the Flexible AC Transmission System (FACTS) devices are considered as the most flexible and feasible option to vary the line flow in an electrical system. This paper presents the background study, construction and application of FACTS devices with different techniques for optimal location of FACTS devices in the system.

1. Introduction

The Electric Power Research Institute (EPRI) was outlined a new thought, in the last period of 1980s, called 'Flexible Alternating Current Transmission System (FACTS)' in which different power-electronics based controllers used which adjust power flow & transmission voltage to moderate dynamic turbulences [1]. Amid most recent couple of years, the FACTS devices have grown an incredible enthusiasm because of ongoing advancement.

The fundamental targets of FACTS devices are to expand the useable transmission limit of lines and control the power stream over assigned transmission lines. The power flow over a transmission line mainly depends on three important parameters i.e., voltage magnitude of the buses (V), impedance of the transmission lines (Z) and phase angle between buses (θ). The FACTS devices can control at least one of the parameters to enhance the performance of the system by utilizing placement and coordination of numerous FACTS controllers in huge scale rising power system networks. Optimal situation of FACTS devices can enhance different working parameters of the power systems. In a power system which transmit and distribute power to generation to distribution end, stability of the system is a big factor. By the FACTS device small signal stability may controlled through the end to end system. Due to change in load transient signal may generate which is may hamper the stability of the system, FACTS device controls the transient response of the system with control of damping ratio of the system. FACTS device enhances the output voltage profile by minimize the signal congestion of the system. By the optimal location of the FACTS device power transfer capability through the lines improved and loadability of the system enhanced.

Within most recent couple of years, the ideas of electricity market were marginally transformed from the past situation. Now, electricity market has multiple number of participants i.e. changed from unidirectional to bidirectional concept (from regulated to deregulated environment). Because of the nearness of numerous market participants, there were competitions among them with respect to the power generation, transmission, distribution and in addition for keeping up the nature of quality of the distributed power.

The placements of FACTS devices are very important in that deregulated market scenario. The primary point of the deregulated market is to limit the electrical system cost. This can be conceivable by limiting the generating cost, emission cost, congestion cost and in addition by limiting the system transmission loss. The congestion and transmission loss cost can be minimized in the deregulated system by optimal placement of FACTS devices. This paper presents a relative review for the placement of FACTS devices in the deregulated power market. The advantages, applications and classifications are also incorporated in this work.

2. Benefits of FACTS Devices

There are numerous benefits for utilizing FACTS devices; however not all are perceptible. Likewise, the cost of FACTS controllers is also massive. In any case, the cost needs to figure against foreseen benefits. FACTS devices can protect the system from potential risk of system collapse, which can have intense outcomes on other economical area too. It can aid to evade the wide spread blackout. The opportunity cost of FACTS controllers in these circumstances has to take into attention.

The utilization of FACTS devices is expanding step by step all through the world for the accompanying properties of FACTS devices – (i) environmental benefit, (ii) increased stability, (iii) increased quality of supply, (iv) flexibility and uptime, (v) reduced maintenance cost etc. Other benefits with the application of FACTS controllers are as follows–

- The power flow in basic lines can be improved as the working margins can be lessened because of quick controllability. In general, the power carrying capacity of lines can be increased to values up to the thermal limits (imposed by the current carrying capacity of the conductors).
- The transient stability limit is expanded in this manner enhancing dynamic security of the system and diminishing the occurrence of the power outages caused by falling blackouts.

An India specific study of Global Hydel Power scenario

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Abstract: Now a day, electricity has become an integral part of the most basic ingredients required for the survival of mankind, besides food, shelter, and clothing. Unarguably, the demand for such an important asset has always been on an exponential rise. As a consequence, to meet this demand, moving from conventional to non-conventional sources for generation of electricity has become an obligation. This paper is prepared with the motive to present the energy gap in recent world with special importance given to Indian subcontinent and how hydropower can prove to be a goldmine in this field. A brief study in the world scenario of hydropower with their advantages, future policy and potential are also presented in this paper.

1. Introduction

According to surveys done by *United States Environmental Protection Agency*, greenhouse gases account for one of the major air polluting agents. Electrical power sector alone was responsible for 32% of total Greenhouse gas emissions in US on 2012. It further added that, greenhouse gas emissions from electricity have increased by about 11% since 1990 [1]. Although, the figures are particularly of US, further studies reveal that they follow almost similar trend throughout the world.

So, to counter this level of air pollution, engagement of renewable sources for generation of electricity has become a necessity. Among the different renewable energy sources, Hydro power deserves a special mention. The most important reason behind this is power system stability. There are also many other advantages of using Hydro power like - reduced tariff, constant power supply, reduced pollution levels etc.The main motivation of using hydel power plant is - hydel power plants can perform independently without depending on foreign fuel sources [2].

Approximately, 2700 TWH of energy is generated every year from hydro power sources around the world. According to the Ministry of Power, Government of India, Hydropower plant provides at least 50% of electricity generation in 66 countries and at least 90% in 24 countries [3].

However, if we turn our attention towards the power scenario of India, figures are somewhat disappointing. Despite having huge potential for hydro power generation in India, we have exploited very small amount of total capacity by hydro power. The data is on a steep rise though. Government of India has set a target of generation of 225GW of power from renewable sources by March 2022 [4]. Out of which 108GW mark has been already achieved.

2. Hydro Power Plant

A hydro power plant uses potential energy stored in water to generate electricity. The conventional follows that water is released from a height, usually top of a dam, which falls with great thrust on turbines attached present at the bottom of the dam. This turbine rotates the shaft of the generators and generators in turn produce electricity.

A new type of hydro electricity generator has recently surfaced. The aforesaid generator makes use of the vortex in water to turn its turbine and generate electricity [5]. As claimed by its inventors of Turbulent, the generator can be placed even at small natural heights. This is an added advantage to this generator over the conventional generators. There has to be enough water head for the conventional generators to produce the required thrust. However, in most places in India, rivers do not have sufficient water round the year, except for the monsoon season. If acclamations of Turbulent are to be believed, their generator may see huge demand in next years. Fig. 1 shows the artistic view of working of Turbulent Vortex.

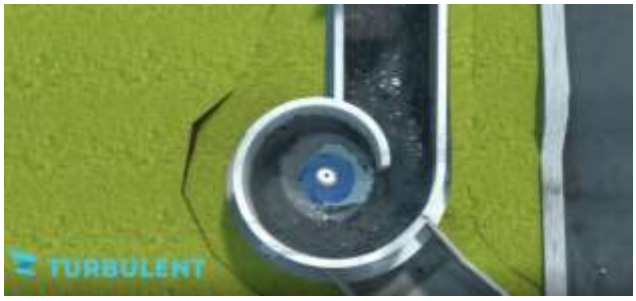
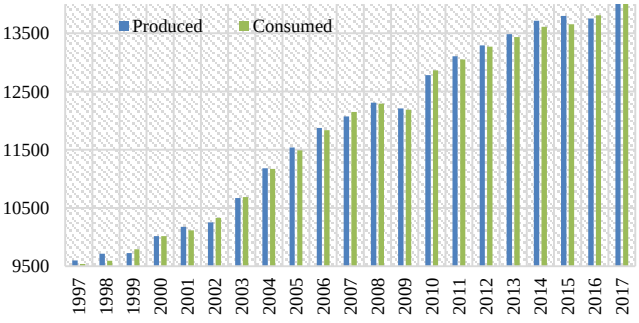


Fig. 1 - Artist impression of working of Turbulent Vortex [6]

3. Global Power Scenario

Throwing light on the past 10 years data on consumption of energy, a very steep rise is what grabs the attention, as is evident from Fig. 2. To keep up this growing demand, a steeper rise on the production curve is evident.

Fig.2 - Comparison of energy production and consumption in metric tonnes of oil equivalent [7]



Performance comparison of various controllers for load frequency control of multi-area gas-thermal system

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Abstract: Load frequency control (LFC) of an interconnected multi-area system with gas plant in Area-1 and thermal plants in Area-2 and Area-3 has been attempted in this work. The performance of Integral (I), Proportional-Integral (PI), Proportional-Integral-Derivative (PID) and Tilt-Integral-Derivative (TID) controllers are evaluated on the system taken for investigation. The application of Social spider optimization (SSO) is made in LFC for simultaneous optimization of the controller parameters. The gains of the controllers are optimized using SSO and the responses so obtained are compared. The comparisons between the responses obtained using TID, I, PI and PID reveal the better performance of TID controller in terms of settling time, peak deviation and magnitude of the oscillations. The study has been extended to the application of random load perturbation in place of step load. The comparison of the responses so obtained are compared which proves the better performance of TID over other controllers in the case of random variation of load as well. Another analysis has been carried out by using TID in one area and conventional I in other areas, and comparing the responses with I in all the areas reveal that the combination of TID and I gives better results.

1. Introduction

The function of electric power system is to deliver uninterrupted electrical power to the consumers. Hence, it is very essential to maintain the balance between power generation and demand from customers. A small deviation in power demand may result in change in the system frequency and scheduled tie-line power flow among the different areas. The proper functioning of power system requires the balance between generation and demand to be satisfied. Load frequency control (LFC) comes into play in this whose prime objectives are to maintain system frequency and tie-line power flow close to its nominal acceptable values.

From the extensive literature survey carried out in the past, a lot of work have been available on LFC of multi-area sys-tem. The idea of LFC was first proposed by *Elgerd and Fosha*, which was carried forward by many researchers. *Janardan Nanda et al.* considered hydro thermal plants for the LFC study. *Ajit Kumar Barisal* attempted LFC study of a two area multi-source system with the incorporation of hydro and gas systems in a single area. It is evident from the available literatures that very few works have been done on gas-thermal system. Hence, it provides scopes for further investigation.

The LFC consists of two types of control, primary and secondary. In LFC, both types of control strategy are applied. Many researchers have employed classical controller such as Integral (I), Proportional-Integral (PI), Proportional-Integral-Derivative (PID). The application of artificial intelligence based controllers like fuzzy logic controller (FLC) (by *G. A. Chown et al.*) and artificial neural network (ANN) (by *S. R. Khuntia et al.*) are also made in LFC studies. The use of fractional order (FO) controllers are also made successfully in LFC by *S. Sondhi et al*. A new FO controller called as Tilt - Integral - Derivative (TID) is invented by *Boris J. Lurie*. and further studied by *Yang Quan Chen et al.*, but its application in LFC is very limited. TID controller has been introduced in LFC study by *R.K. Sahu et al.* But its effectiveness is not evaluated in three area gas-thermal system. Hence, its effectiveness may be tested on a of gas thermal system

It is very essential to set the controller gains at such a value, so that it will decrease the value of the objective function. Many classical techniques were used for the purpose of choosing the optimum value of gains. In LFC studies, many literatures are available which have used different heuristic optimization techniques such as genetic algorithm (GA) (by *Sakti Prasad Ghoshal et al.*), particle swarm optimization (PSO) (by *Sakti Prasad Ghoshal.*), bacteria foraging (BFO) (by *E. S. Ali et al.*), artificial bee colony algorithm (ABC) (by *H. Godze et al.*), firefly algorithm (FA) (by *K. Naidu et al.*), etc. for simultaneously optimization of the controller gains. Each technique presented has their advantages and disadvantages based on the applications. An optimization technique based on the behavior of social spider called Social Spider Optimization (SSO) was developed by *Erik Cuevas et al*. There are many advantages of this technique over other optimization techniques like overcoming premature convergence etc. However, the utility of SSO is not yet to be tested in the area of LFC. Hence, further investigations may be carried out using SSO in LFC.

In view of the above, the objectives of the presented work are:

1. To develop a three area system gas thermal system with generation rate constraint (GRC) and governor dead band (GDB) considering I, PI, PID
2. To apply Social Spider Optimization (SSO) technique for optimizing the gains of controllers.
3. To apply TID controller as secondary controller and compare its performance with I, PI and PID in a) for 1% step load perturbation in Area-2.
4. To study the behavior of PID and TID controller under random load perturbation
5. Compare responses to find the best combination of controllers

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Tidal Energy as Emergent Energy Source: A Review

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Abstract: Due to the high degradation of coal and fossil fuel, moving from conventional energy sources to renewable energy sources is not the option, it is a necessity if we don't want to sacrifice our comfort in terms of using electrical energy based equipment / machinery. Now a day, wind and solar energy have already shown their enormous potential as energy sources throughout the world, but there are some other renewable sources i.e. geothermal, biofuel, biogas, biomass, hydropower (small), tidal power etc. which can stand their positions in the competitive market of renewable energy (with wind and solar energy). This paper exhibits the present scenario, availability and future potential of tidal energy in Indian power sector as well as India's positions about the application of tidal energy in the global power sector.

1. Introduction

During last few decades, the basic necessity of human beings are upgraded in every aspects of life with the advancement of technologies in various dimensions. As a result, energy requirement / demand are increased with a very high rate. But due to the environmental, economic and political barriers, it is very difficult to mount new generating stations as well as transmission lines. So, there is a possibility of load shading due to the mismatch between the energy generation and demand. On the other hand, transmission line outage may also occurred for the overloaded conditions of transmission lines. The uses of renewable energy sources and FACTS devices are the most feasible and viable options for overcoming the said electrical problems like load shading, line congestion respectively.

In recent days, wind and solar energy are most popular renewable energy sources for their social, economic and environmental benefits. But, tidal, biogas, biomass, geothermal energy are the upcoming renewable energy sources. The power generation from wind and solar is very uncertain due to their intermittent natures. Wind does not always flows, solar does not always rise but tides are always predictable and constant independent of time. So, tidal energy is more dependent renewable energy sources than the solar and wind energy.

According to *Fan Zou (2004)*, one of the first-born renewable energy sources of the world is tidal energy. The flow of tides are totally depends on the gravitational forces utilized by the sun, moon and spinning of the earth. But, there are some limitations for producing tidal power. Tidal power plant has to be mounted along coastlines. There are two low tides and two high tides are experienced by the coastline in regular basis. The electricity can be generated from the tides if the difference is at least 5 meters in water levels (Source: *National Geographic Education, Tidal Energy, 2014*). The human beings are connected with the presence of tides and utilized its energy through many centuries. During a long years back, tide mills have used for generating the power from the tide which are very similar to the water wheels.

In the year 619, the eldest excavated tide mill was exposed at Northern Ireland. It is assumed that, this tide mill has installed for the grinding grain (Source: *ELI: Energy: Support Materials: Tidal Energy*). From the middle age, tide mills are became more renowned. At that time, pond is used as a water storage system. This pond is filled up when the tide came in. A water wheel is used for generating the power by using the water when tide went out from the pond. In 18th century, approximately 75 tide mills were used in London, whereas about 750 tide mills were in operative mode around the Atlantic Ocean at that time (Source: *Tidal Power. Available: http://tidalpower.co.uk/*).

During the last few years, various research has been carried out for discovering the present status and future potential of the renewable energy throughout the world with targeting the construction of new technologies for utilize the renewable energy more properly and efficiently. Maximum researchers have been given their focus on solar and wind energy. But, there are enormous provisions for using the bio power, geothermal and tidal power as a renewable energy sources. In this paper, an indication about the current status of tidal power is discussed for Indian as well as global electrical sector. The history of the tidal power plant has been also deliberated in this work.

2. Background of Tidal Energy

Tidal energy is one of the most auspicious renewable energy sources, which is basically one types of hydropower where, energy is converted from tides to the electrical. The world's foremost tidal power station with the generating capacity of 240 MW has been installed on 26th November 1966 in France named "Rance Tidal Power Station" (Source: *National Geographic Society*). Till now, a huge parts of Brittany, France has been electrified by taking power from that plant. With 24 turbines, "Rance Tidal Power Station" may generate up to 600 GWh of electricity in a year.

In August 2011, world's largest tidal power plant "Sihwa Lake Tidal Power Station" has been started their operation in South Korea. This power plant has a generating capacity of 254 MW and comprises of 10 turbines (Source: *National Geographic Society*). World's another three largest tidal power generating stations are "Swansea Bay Tidal Lagoon" in United Kingdom with generating capacity of 240 MW, "MeyGen Tidal Energy Project" in Scotland with generating capacity of 86 MW and "Annapolis Royal Generating Station" in Canada with generating capacity

Profit Maximization of EV Integrated Hourly-Ahead Deregulated Electricity Market using Lion Optimization Algorithm

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Abstract:

Deregulated electricity market motivated electric vehicle (EV) users for supplying the electricity to the grid at high price during peak demand period for sustainable development of the grid. In this paper, generation companies (GENCOs) and distribution companies (DISCOs) are submitted their hourly-ahead bids price to the independent system operator (ISO) for settled down the electricity market at market clearing price (MCP) and market clearing volume (MCV). Based on the MCP, the profits of the GENCOs are determined. The optimal location of EV aggregator charging/discharging station is found by using lion optimization algorithm (LOA). The main aim of this paper is to maximize profit of the GENCOs in an hourly-ahead deregulated market considering EV aggregator in electricity market. To apply this approach, IEEE 30 bus system is used as a test system.

1. Introduction

In a deregulated electricity market, the price of electricity is volatile nature due to the variation in of electricity demand. This volatile nature of electricity price motivated the EV users to integrate the electricity in market. In this electricity market, the impacts of large number of plug in electric vehicles (PEVs) are very important and interesting because they may inject or absorb power to the grid or from the grid (Jamshid Aghaei, Ali Esmaeel Nezhad, 2016). When price of electricity is low, large numbers of PEVs are charging via charging EV station and absorb power from the grid and when price of electricity is more, adequate numbers of EVs are feeding power to the grid through EV aggregator (E. Sortomme, M. El-Sharkawi, 2011 and Miadreza Shafie khah *et. al*. 2016). To find the optimal location of EV charging station in a distribution system for exchanging electrical energy between EVs and the electricity grid, hybrid particle swarm optimization algorithm is used (Abhishek Awasthi, Karthikeyan *et. al*. 2017). But for practical implementation of EV charging station, other factors like EV charging time, type of EV equipments charging demand of EV are also considered (Hyung Bin Moon *et. al*. 2018). This EV charging plays a very important role for load shifting in the grid by charging EV during work hour of the day (Till Gnann *et.al*. 2018 and Axel Ensslen *et.at.* 2018).

In deregulated market, day-ahead or hourly-ahead market mechanism is very much essential to determine the load and generation scheduling according to the system operator requirement. Based on the hourly-ahead load forecast and GENCO's data, ISO allocates generation output for each unit (Guangquan Zhang *et.al.* 2011). But, it is very much challenging task due to the continuous increasing and variation of load demand pattern in the electricity market (Guodong Liu *et.al*. 2016). The electric vehicle can be easily manage the increased and interrupted nature of load demand and it can also minimize the emission by avoiding the use of fossil fuel for vehicle (Joaquim Delgado *et.al*. 2018). To effectively and efficiently use of EV in an electricity market by ensuring the system stability, accurate prediction of EV charging station is required. But, to identify the proper location of EV charging station, electricity load demand forecasting is very much essential in deregulated electricity market (Hyung Bin Moon, *et.al*, 2018). To handle the unpredictability and variability of demand and generation source, electric vehicle has been used in the deregulated electricity market (Ehsan Mirmoradi *et.al.* 2016). Integration of PEVs is one of the most effective solutions for managing the uncertainty of power demand in today's electricity market.

In this paper, EV based hourly-ahead electricity market is discussed to maximize the suppliers profit. To calculate the supplier profit and to identify the optimal location of EV aggregator charging station, LOA is used here. The present EV integrated electricity market is solved in two steps: initially electricity market is settled without considering EV aggregator and finally market is settled with considering EV aggregator. The optimal location of EV aggregator is found by using LOA algorithm and the bidding price of EV aggregator is decided by MCP at that time of the system. LOA algorithm and modified IEEE 30 bus system is used to analysis the proposed method and the results obtained are compared with ABC algorithm.

Nomenclature

EV	Electric vehicle
PEV	Plug in electric vehicle
ABC	Artificial bee colony
LOA	Lion optimization algorithm
MCP	Market clearing price
MCV	Market clearing volume
GENCO	Generation company
ISO	Independent system operator
P_i^{bid}	GENCO price bid
Pg_i	Active power generation from individual generator
Qg_i	Reactive power generation from individual generator
a_i, b_i, c_i	Generator actual cost coefficient

A new enhanced secure anonymous communication with authentication and session key agreement in global mobility network

Publisher: IEEE

Prasanta Kumar Roy ; Krittibas Parai ; Sathi Ball ; Bipin Kumar All Authors

Abstract: Recently, several protocols have been proposed to accomplish user authenticity with proper session key establishment in Global Mobility Network. Unfortunately, some of th... **View more**

Metadata

Abstract:
Recently, several protocols have been proposed to accomplish user authenticity with proper session key establishment in Global Mobility Network. Unfortunately, some of them still suffer from various security threats and high computational complexity. This article demonstrates a new enhanced two-factor authentication scheme for secure anonymous communication to mutually authenticate the communicating parties and to establish a proper session key between them. The major contributions of this article are 1) to achieve all kind of security goals and 2) to effectively reduce the computational complexity. The underlying construction is developed using Elliptic Curve Cryptography (ECC) along with light-weight processes to ensure the resistibility against well-known security threats and improved computational complexity. The protocol is implemented using HLPSL and formally validated using AVISPA to ensure that it has the ability to withstand several attacks. We have also compared the computational complexity of our protocol with some existing protocols to prove its efficiency.

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Secure Anonymous Session Key Agreement Between Trusted Users in Global Mobility Network

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Abstract

Ensuring trust between communicating parties over insecure channel is a crucial issue in global mobility network (*GLOMONET*). In 2014, Xie et al. proposed an authentication protocol for roaming services based on Elliptic Curve Cryptography (*ECC*). In this article, we argue that Xie et al.'s construction suffers from several limitations such as susceptible to denial of service, vulnerable to key compromised impersonation attack and man-in-the-middle attack, unverified login phase, improper mutual authentication, excessive computation cost during password changing phase and clock synchronization problem. Hence, we propose an improved smart card (*SC*) based anonymous two-factor authentication scheme using *ECC* suitable for roaming services in *GLOMONET*. The formal security validation using widely accepted AVISPA tool and the performance analysis phase at the end of this article prove the strength of our protocol in terms of security and computation cost.

Keywords

Anonymity Authenticity Session key agreement Security Global mobility network

References

Overlapping Community Detection Through Threshold Analysis on Disjoint Network Structures

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Part of the Advances in Intelligent Systems and Computing book series (AISC, volume 706)

Abstract

Distributed approach in a network is a prime attribute to achieve quality throughput. Many real-life infrastructures share such distributed network structures. Recently, researchers are focusing on different prime attributes of these distributed networks and meaningfully analyzing them to retrieve essential information toward throughput enhancement. These structures exhibit different constructs. Some of those are static and some are dynamic. They also contain strategic groups within it. Appropriately, identifying these groups is the key essence of community detection. Present work applies a novel mechanism for graphical analysis of network structures to detect overlapping communities. Experimental findings and comparative analysis with existing methods show efficacy of the present algorithm.

Keywords

Betweenness study Community detection Disjoint community Overlapping community Threshold analysis

References

1. Palla, G., Derenyi, I., Farkas, I., Vicsek, T.: Uncovering the overlapping community structure of complex networks in nature and society. Nature **435**(7043), 814–818 (2005)

Description:

Multimedia represents information in novel and varied formats. One of the most prevalent examples of continuous media is video. Extracting underlying data from these videos can be an arduous task. From video indexing, surveillance, and mining, complex computational applications are required to process this data.

Intelligent Analysis of Multimedia Information is a pivotal reference source for the latest scholarly research on the implementation of innovative techniques to a broad spectrum of multimedia applications by presenting emerging methods in continuous media processing and manipulation. This book offers a fresh perspective for students and researchers of information technology, media professionals, and programmers.

Coverage:

The many academic areas covered in this publication include, but are not limited to:

- Biomedical Image Processing
- Biometric Systems
- Cellular Automata Algorithms
- Compressive Sensing
- Content Based Image Retrieval
- Content Convergence
- Feature Extraction
- Image Segmentation
- Multilevel Image Segmentation
- Particle Swarm Optimization

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Reviews and Testimonials

Researchers in information technology and related disciplines introduce new ways to analyze multimedia information using intelligent approaches. Their topics include theoretical concepts and technical aspects of image segmentation, the retrieval of multimedia information using content-based image retrieval techniques, Indian river watershed image analysis using a hybrid fuzzy-cellular automata approach, detecting gradual transitions in videos: approaches and applications, integrating different analytical concepts on multimedia contents in service of intelligent knowledge extraction, and digital watermarking: the technical art of hiding a message.

– Protoview Reviews

The main strength of this book is that it establishes the missing link between the research available in this relevant field and forthcoming trends. The book is well organized such that the readers can easily grasp the different facets of multimedia information analysis in regards to different forms of multimedia information. **Highly Recommended**.

– Dr. Xiao-Zhi Gao, Lappeenranta University of Technology, Finland

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Optical Properties of Chemically Synthesized Amorphous Carbon Nanotube and Cadmium Selenide Quantum Dot Hybrid

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Abstract— **With the advancement of the modern technologies, the dimension of the devices are ever shrinking. Among all the materials, Silicon has become the material of choice for fabricating devices in the nanometer range due to its different favorable properties. Research is also going on the use of other type of nanostructured materials for their possible application in devices. Carbon nanotubes (CNTs) and organic and inorganic Quantum dots (QDs) are also investigated for their different favorable properties and applications. This article reports the synthesis of amorphous Carbon nanotubes-Cadmium Selenide quantum dots by simple chemical process. The morphology of pure and hybrid samples were studied by field emission scanning and high resolution transmission electron microscope. Detail optical properties, especially UV-Vis absorption and photoluminescence property of the as prepared hybrid samples were studied in order to judge their possible application in optoelectronic devices.**

Keywords— Amorphous carbon nanotube, Quantum dots, Hybrid nanostructure, Optical Property, Photoluminescence

I. INTRODUCTION

The dimensions of electronic devices are decreasing day by day. Channel length of 10 nm has even being achieved in modern VLSI devices. Though silicon is now considered to be the most suitable material for the fabrication of electronics devices with nanometer dimensions due to its different favorable properties however researchers are also investigating other nanostructured materials for their possible use in modern devices. The other nanostructures can be zero, one or two or three dimensional or their suitable hybrids. In this regards one dimensional carbon nanotubes (CNTs) or different zero dimensional semiconductor quantum dots (QDs) and even their possible hybrids are of considerable interest. Semiconductor QDs include ZnO, CdO, CdS, ZnS and many others. Keeping this in mind here we have reported the chemical synthesis of hybrids of one dimensional CNTs and zero dimensional cadmium Selenide quantum dots (CdSe QDs) as individually both the materials have shown different favorable properties which can be used in electronic devices.

CNTs have been investigated extensively since its discovery by Iijima in 1991 [1]. CNTs have reportedly shown remarkable electronic, optical and mechanical properties. This material is successfully being used in making supercapacitors and sensors, field emitter and many other devices [2-3]. CNTs have even been used as channel in field effect transistors and display devices [4-5]. But most of the research on the use of CNTs is centered on the synthesis and application of crystalline CNTs. The synthesis of crystalline CNTs often requires the use of multiple steps at elevated temperatures which are costly and complex.

Amorphous Carbon nanotubes (a-CNTs) as a replacement for crystalline CNTs, have attracted the attention of the researchers due to its different favorable properties. Synthesis of a-CNTs can be done in open air atmosphere. a-CNTs have also shown good field emission property as has been shown in our previous work [6, 7]. Moreover the outer surface of the a-CNTs often has many defects and dangling bonds. These defects can be helpful in forming hybrid nanostructures with other nanomaterials.

Quantum dots (QDs) on the other hand, are considered to be nanoparticles having dimensions in the range of 1-10 nm. QDs are characterized by quantum confinement and size dependent properties. Both semiconducting and organic QDs have shown remarkable properties. Infect Group II-IV CdSe QDs were among the first QDs to be fabricated. Both organic and inorganic QDs are characterized by size dependent properties. The size of the QDs can be controlled by manipulating different synthesis parameters and this way the properties of the QDs can be tailored. The QDs have shown remarkable optical properties which can be used in photovoltaic and other applications [8-9].

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Effects on I-V Characteristics of RTD Due to Different Parametric Variations

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***Abstract*—In this paper, novel features offered by Resonant Tunneling Diode (RTD) are reviewed by simulating it under different conditions. The commonly used GaAs/AlGaAs RTD is used as the reference one. The effects of variations of different parameters on RTD's characteristics are mainly focused in this work. A simple model of resonant electronic transport through a double-barrier structure is developed and it is simulated in Silvaco-Atlas software. I-V characteristics are studied by varying barrier parameters and well width. Different peak and valley currents are measured under these conditions. For the same set of parameters both symmetric and asymmetric cases are considered.**

Keywords— Peak to valley ratio, Quantum well, Resonant Tunneling, Transfer matrix

I. INTRODUCTION

Advent of the semiconductor technology a complete system is developing within system on chip. Device structure becoming smaller and the quantum mechanical effects appear to be most important factors of consideration.Due to scale down of the dimensions close to electronic wavelength device behavior is dominated by the phenomena like tunneling, interferences and quantization [1].

Esaki and Tsu [2] highlighted the usefulness of the properties exhibited by the hetero structure. They focused the idea of varying the potential in their proposed structure. Considering the finite superlattice, authors [3] have also computed the transport properties. Experiment conducted to find the I-*V* characteristic was restricted with special periods or mean free path for the electrons were also considered to be relatively small.

Esaki et al. considered the double barrier structure with thin GaAs sandwiched between two GaAlAs barriers to show the resonant tunnelling [4].The fabrication of such structure and demonstration of the predefined phenomenon were challenging jobs. Advancement in epitaxial growth techniques provides a new flavour in this area. Sollner et al. observed the resonant tunneling through a single quantum well of GaAs [5].

Si is rarely used to form RTD because it has no perfect lattice matched heterostructure. Other way to form the heterostructure is also suffers from drawback of finding small conduction band offset [6-8]. AlGaAs/GaAs materials were commonly used in Earlier RTDs [1], [9-10]. AlGaAs as barrier offers high peak current densities (Jp) but thermionic emission and tunnelling due to thermal assistance force the PVR to reduce.With improved barrier height and incorporation of larger subband separation PVR and Jp were enhanced [11-12].

In this paper we have considered the structure of AlGaAs-GaAs based RTD and simulated it using Silvaco-Atlas software. Results are obtained due to variation of different parameters. These are compared and the effects of variations of different device parameter are pointed out. These effects help to choose better device structures to achieve better result.

The paper is organized as follows: Section II, describe the proposed device structure. Section III and IV presents the simulated result and discussion of the result respectively. The proposed work is concluded in Section V. The work has done by varying the parameters while keeping the RTD structure symmetric and asymmetric separately.

II. PROPOSE DEVICE STRUCTURE

The basic theory of RTD is based on quantum well and tunneling phenomena is derived by Transfer matrix method [4].Transmission amplitude is given by the equation

$$T=M_{ll}-M_{12}M_{21}/M_{22} \qquad (1)$$

This amplitude is used to find net tunneling current. The equation of the following current is given by

$$J=\frac{em^{*}kT}{2\pi^{2}\hbar^{2}}\int_{0}^{\alpha}T*T\ln\left(\frac{1+\exp[(E-E_{F})/kT]}{1+\exp[(E_{F}-E-eV)/kT]}\right)dE \qquad (2)$$

The basic RTD structure is a square quantum well with two ultra thin barriers. The well material is a low band gap material, here used GaAs as well material of 10nm width and a higher band gap material AlGaAs is used for barrier. Width of the barrier is kept 20nm for standard structure. The thin width of barrier helps the electron to tunnel through the barrier whenever energy of the incident electron matched with any energy levels of well. The structure that is well sandwiched between two barrier is ended with two electrodes. The electrodes are formed by heavily doped GaAs. In this work the doping level is kept as 10^{18}/cc. This results the Fermi level within the conduction band of the electrodes. Whenever energy applied across the electrodes; energy of electrons of emitter side rises and at a time it matches with lower energy state of the well, the tunneling starts and current increases.

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Probe-fed semi circular microstrip antenna vis-à-vis circular microstrip antenna: a necessary revisit

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Abstract. Microstrip patch antenna of semicircular geometry has been investigated in view of miniaturization of conventional circular geometry. The precise operating frequency of the semicircular microstrip patch antenna is the most significant parameter to be determined in order to design such antenna system to achieve the optimum performance. In the present investigation an improved formulation is presented for accurate determination of the resonant frequency of semicircular patch. Also, the radiation property of such patch is thoroughly investigated. Through comparisons are documented amongst the circular and semicircular patches. It is revealed that, the semicircular patch offers more better radiation performance compared to circular.

1. Introduction

The circular geometry of the microstrip antenna is the most common geometry which has been studied, analyzed and implemented for over last three decades[1]-[4]. In the present era, the scientists and engineers are looking for tiny devices, which can be implemented in miniaturized wireless communication equipment without hampering the performance. In that scenario, semicircular patch antenna is a good choice which can produce such typical qualities like tininess, light weight and compatibility with MMIC along with acceptable radiation performance. In fact, semicircular patch is very advantageous where the space is the key factor to organize a patch with conventional geometry. In fact, 50% of patch area reduction can be achieved using semicircular patch for a particular resonant frequency compared to conventional circular patch geometry. Hence, the accurate determination of mode as well as its radiation performance of a semicircular patch is very important in this scenario.

The electric field beneath the patch and eigen functions of circular sector antennas were presented in [5]. Generalized transmission line modeling of sector antenna has been found in [6]. But all these papers indicated above fail to predict resonant frequencies of sector antenna accurately. In fact, in all of those investigations, the concept of fringing is not

considered. Nevertheless the issue of fringing can not be avoided for accurate computation of dominant mode and its resonant frequency. The effect of fringing has been considered in [7]-[8] for computation of resonant frequency of sector antenna. Still they fail to predict the accurate resonant

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Academic Science

RPR-A Bridge between ETHERNET and SONET Technology

Anindita Sinha, Sarmistha Mondal
Assistant Professor, Dept of ECE, Siliguri Institute of Technology

Abstract: *Resilient Packet Ring Technology (RPR) acts as a bridge network under IEEE 802.17 workgroup.The main objective of RPR technology is to integrate the intelligent features of IP MAN network. RPR network enables the alternative of SONET & ETHERNET and provides carriers with resiliency and restoration property. This paper is going to describe the overview, working operation and features of RPR technology.*

Key words: Ring Technology, Bridge, IEEE 802.17 workgroup, Fairness, Resiliency.

1. INTRODUCTION

An important trend in networking is migration of packet based technologies from LANs to MANs. Integrating the intelligent features of IP network, economical feature of Ethernet and high bandwidth utilization and availability of optical fiber ring network, RPR is an ideal networking solution for IP MAN.RPR technology is an emerging network architecture designed to migrate from LAN to MAN network.MANs or WANs service provider are often based on SONET and SDH ring, consist of a dual ring configuration where one ring is used as back up and another ring is remain unused during normal operation, only in case of primary ring fails but in gigabit ethernet does not require static resource allocation and it is cost effective too whereas the problem occurs in case of auto-restoration and fairness properties.RPR is an emerging network architecture designed to meet " SONET performance at Ethernet Economics". Service providers such as cable multiple-system operators (MSOs), ISPs, POST TELEPHONE & TELEGRAPG ADMINSTRATION (PTTs) have deployed current RPR solutions from CISCO and SUN Microsystems.

2. 1. FEATURES:

RPR technology has some important features:

2.1.1:Resilience-proactive span protection automatically avoids falled spans within 50ms**.**
2.1.2:Services-support for latency/jitter sensitive traffic like voice and video.

2.1.3:Efficiency(Spatial Reuse)-increases the overall aggrement traffic on the ring. It is possible by permitting traffic to be passed bi-directionally on the ring only on spans between source and destination node.

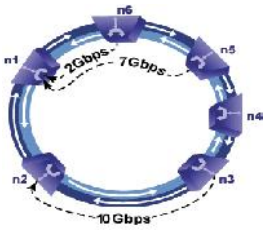

Figure1: Spatial Reuse in an RPR ring

2.1.4:Scalable-supports topologies of more than 100 nodes/ring mechanism of auto topology discover.

2.1.5:Fast protection & restoration: self healing capabilitywhich allows ring to automatically recover from a fiber cut or node failure achieved by wrapping traffic within 50 ms restoration time.

2.1.6:Fairness-most important featuresof RPR technology. It is achieved when the traffic of two service flows that have the identical same service level aggrement. Each node on metro ring executes an algorithm designed to ensure that each node will get its fair share of bandwidth

Fairness Algorithm-

i) Detects and eliminate congestion.

ii) Transmit and receive fair control messages between RPR station.

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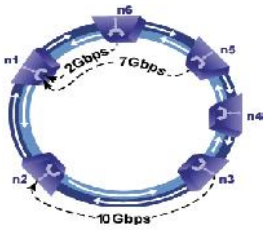

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Study on the Chaotic Dynamics & its Control in a Time Delayed Optoelectronic Oscillator

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Abstract

The present literature reports the effect of an external synchronizing signal on the chaotic dynamics of a single Loop optoelectronic Oscillator (SLOEO). It has been observed that the OEO can produce chaotic oscillation with small change of feedback loop delay and application of an external periodic signal with suitably chosen amplitude and frequency can destroy the chaotic oscillation and produce single frequency oscillation. The proposed method can be used to suppress the chaotic oscillation in an OEO.

Key words

Delay dynamical system, optoelectronic oscillator (OEO), Chaos, synchronization.

1. Introduction

Over the last few years OEO has seen wide spread application in the field of RADAR, fiber optic communication system, long distance digital communication system, in view of the fact that it has the ability to produce high frequency signal with ultra high spectral purity. This oscillator was first introduced by Neyer & Voges[1]. Posterior to their pioneering work, Yao and Maleki

Transmission Congestion Relief with Integration of Photovoltaic Power Using Lion Optimization Algorithm

Sadhan Gope, Subhojit Dawn, Rituparna Mitra, Arup Kr. Goswami and Prashant Kr. Tiwari

Abstract Transmission congestion is a vital problem in a deregulated power system. This paper proposes a novel transmission congestion management approach considering photovoltaic (PV) power using lion optimization algorithm (LOA). The main contributions of this paper have twofolds. Initially, the values of bus sensitivity factor (BSF) and generator sensitivity factor (GSF) are, respectively, used to select the optimal bus to integrate PV power and to select the participating generators for congestion management. Finally, LOA is used to determine the active power rescheduling amount and congestion cost. Test results on modified 39 bus New England system indicate that the LOA approach could provide a less active power

Maximization of Social Welfare by Enhancement of Demand-Side Bidding in a Deregulated Power Market

Subhojit Dawn and Sadhan Gope

Abstract This paper presents a productive, coherent, and efficient approach to maximize the social welfare and minimize the system losses of an electrical system by incorporating power pool model in a fully deregulated power environment. Generation-side bidding and demand-side bidding both are considered in this work with the help of three evolutionary algorithms like particle swarm optimization (PSO) algorithm, artificial bee colony (ABC) algorithm, and BAT algorithm (BA) to check the potential and effectiveness of the presented approach. Investigation of the presented work clearly reveals that the increment in the demand-side bidding reduces the system losses and improves the voltage profile. Modified IEEE 14 bus and modified IEEE 30 bus test systems are considered for analyzing and validating the presented approach.

Keywords Deregulated power market · Social welfare · Particle swarm optimization (PSO) · Artificial bee colony (ABC) algorithm · BAT algorithm (BA) · Demand-side bidding

1 Introduction

Deregulation in energy market introduces competition among energy supplier and energy buyers. In deregulated market, the price of the energy generation is not fixed by any governing body, but after the completion of the bidding process independent system operator (ISO) sets the prices with reviewing both generation companies (GENCOs) and distribution companies (DISCOs) bids. In this market, customer can

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Load Frequency Control in a Hybrid Thermal-Wind-Photovoltaic Power Generation System

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Abstract—Deviation of frequency is a major concern in case of hybrid power generating system. Load frequency control of a thermal, wind and solar based hybrid power generation system is presented in this paper. First order proportional–integral–derivative (PID) controllers are used to reduce the deviation of frequency in the proposed LFC. Bacterial Foraging Optimization (BFO) technique is used to optimize the gains of PID controllers. MATLAB/SIMULINK based simulation study shows that the proposed BFO tuned PID controllers are capable to maintain frequency within tolerance range of the hybrid generating plant under various instabilities and system uncertainties.

Keywords—Hybrid power generation, load frequency control, Bacterial foraging optimization technique, PID controller

I. INTRODUCTION

The increased penetration of renewable energy into electricity supply pose threat to power system balance. Wind speed is variable in nature throughout the year in a certain place which causes variation of the output power and frequency of wind generator. Photovoltaic generation is also variable as dependent on ambient conditions [1]. So it is difficult to control frequency of a hybrid generating system without any advanced control technique due to the intermittent nature of renewable sources. The output of renewable energy sources may affect grid power, thus, causing a major problem from frequency fluctuation of the grid. Also, a sudden change of load demands causes for power imbalance and frequency deviation.

In modern power system Automatic Generation Control (AGC) is one of the most important ancillary services. The main objective of AGC is to maintain the balance between generation and load demand, thus minimizing the frequency deviations

A well designed and operated power system must be balanced with the variable load and system disturbances, with high level of power quality while maintaining both voltage and frequency within acceptable limits [2].

For wind power generation under fluctuations of load demands and random wind power input, the pitch controller of the wind side, may no longer be able effectively to control the system frequency due to their slow response [3]. So it is examined that for any variation of load demand and inputs of renewable sources the output frequency is affected. That is why the importance of load–frequency control (LFC) in design and operation of electric power system has come into consideration. The LFC in an interconnected power system maintains the frequency of each area within limits by adjusting the real power outputs of the generators to make flow of the tie-line within some pre-specified tolerances and accommodate fluctuating load demands.

Different methods and controllers have been implemented to maintain the load frequency constant [4]. They include flat frequency control (FFC) [5], tie-line bias control (TBC) [6] and flat tie-line control (FTC) [7]. Controllable load is used to absorb excess generation for facilitating LFC in case of renewable energy source integrated system [8].

In this study, proportional–integral–derivative (PID) controller is used in LFC and Bacterial Foraging Optimization Technique (BFO) is applied to tune gain parameters of PID controllers. A developed MATLAB/SIMULINK model from the aspect of LFC study for a thermal, wind and solar photovoltaic (PV) based hybrid system shows that the BFO tuned PID controllers are capable to maintain rated frequency under the fluctuation of load demand and variable generation from wind/PV sources.

II. SYSTEM DESCRIPTION

A hybrid system comprising one thermal, one wind farm and one PV power generations are considered here and the deviation in the output frequency of the entire interconnected system is maintained zero under any variation of load and uncertainty. One controllable ballistic load is used to damp the extra power from the renewable sources to match the energy generation with the total load power consumption and maintain constant load during the lightly loaded period.

A. Modeling of thermal generation

The thermal area is designed in SIMULINK through the transfer functions of the corresponding equations. This area consists of speed governing system, model of turbines, generator and load. Here we have taken a step load to

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An Efficient Flux Weakening Control Strategy of a Speed Controlled Permanent Magnet Synchronous Motor Drive for Light Electric Vehicle Applications

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***Abstract*—In this proposed work an efficient flux weakening control strategy of a four quadrant speed controlled Surface Mounted Permanent Magnet Synchronous Motor drive is presented. Permanent magnet synchronous motors are extensively used in light electric vehicle applications because it has large power density, high torque to inertia ratio, lower excitation losses and higher efficiency. In this proposed concept for speed controlled drive PWM current controller and PI speed controller is taken into consideration. For the implementation of such flux weakening control scheme a vector controlled surface mounted PMSM drive is established. It is emphasized that demagnetizing component of the d-axis current is introduced into the stator current. Therefore the proposed approach establishes better dynamic as well as steady state drive performance for high speed and energy efficient light electric vehicle applications. Hence a novel and efficient flux weakening control strategy is achievable.**

Keywords—Flux weakening operation, Permanent magnet synchronous motor (PMSM), light electric vehicle, PWM controller, Speed controlled drive

I. INTRODUCTION

The invention of electrical vehicle is a promising and efficient approach for individual and urban transportation due to the fuel energy resources exhaustion and society concern. Due to the limited life-span of batteries, electric motors for automotive applications are normally fabricated to optimize the energy efficiency with a reduced volume [1-3]. Due to the advancement of permanent magnet materials and concept of modern converter technologies along with some sophisticated control algorithm permanent magnet synchronous motors are extensively used in automobile applications. Ideally, in a Permanent Magnet Synchronous Machine the features of air gap flux density distribution and voltage generated in the stator windings supplied by the permanent magnet material employed generates sinusoidal waveforms [4]. In the flux-weakening region while the inverter voltage is maintained, various control algorithms have been proposed to obtain the desired torque-speed performance. With the corresponding optimum dc link voltage and consequently the maximum input voltage and rated torque, the machine attains a speed termed as the base speed [5-6]. Beyond this speed the emf induced will cross the maximum applied voltage which in turn makes the phase current of the machine impractical. To conquer this circumstance, the induced emf must be less than the applied voltage by weakening the air gap flux linkages. The mutual air gap flux linkage is the product of the rotor and the stator flux linkages. This proposed process of flux weakening control is analogus to the flux-weakening technique normally done in the separately excited dc machine [7].

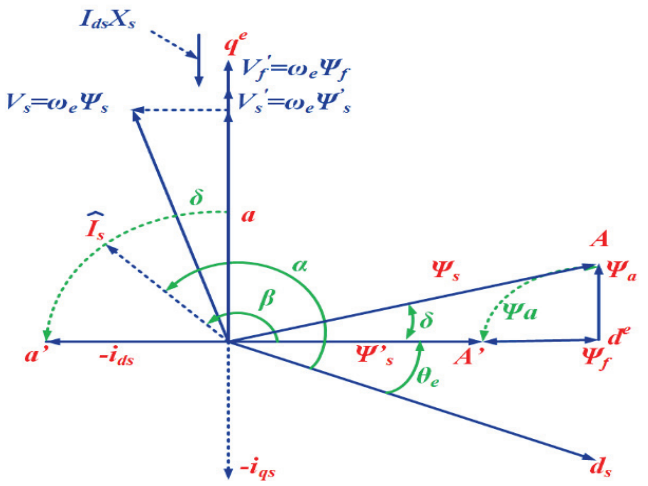

Fig. 1. Phasor diagram of a PMSM drive during flux weakening.

Permanent magnet synchronous machines (PMSM) have a major impact in a wide variety of industry applications, particularly the hybrid electric vehicle technology for their high power density, high torque-weight ratio and fast torque-speed or dynamic response. However both interior as well as surface mounted PMSMs have been employed for EV traction drives. Moreover interior PMSM is suitable for EV propulsion system as they can offer higher reliability and overload ability than surface mounted PMSM [8-9]. In case of electric vehicle traction applications a large speed range is mostly advantageous. Since no magnetization current is required for establishment of air-gap flux therefore PMSM imparts a high overall efficiency in the normal speed operating region. The permanent magnet synchronous machine possess the high power density which enhances the torque/weight/volume ratio even in the assembling space of a vehicle‘s engine compartment [10]. By weakening the flux PMSM attains a high speed and improved efficiency in a well defined speed range.

Facial Expression Recognition Using Distance Signature Feature

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Abstract

Distance feature has great significance in recognizing facial expressions. Identifying accurate landmarks is a vital as well as challenging issue in the field of affective computing. Appearance model is used to detect the salient landmarks on human faces. These salient landmarks form a grid on the human face. Distances are determined from the one landmark point to another landmark point in grid and normalized. A novel concept of corresponding stability index is introduced which eventually is found to play important role to recognize the facial expressions. Statistical analysis such as range, moment, skewness, kurtosis, and entropy are calculated from normalized distance signature to supplement the feature set. This enhanced feature set is supplied into a Multilayer Perceptron (MLP) to arrive at different expression categories encompassing anger, sadness, fear, disgust, surprise, and happiness. We experimented our proposed system on Cohn-Kanade (CK+), JAFFE, MMI, and MUG databases to training and testing our experiment and establish its superiority performance over the other existing competitors.

Keywords

Grid Distance signature Stability index Feature extraction Feature classification MLP

Conferences > 2017 Third International Conf...

Facial expression recognition using shape signature feature

Publisher: IEEE

Asit Barman ; Paramartha Dutta All Authors

Abstract: In this paper, we propose a novel framework for expression recognition by using salient landmarks induced shape signature. Detection of effective landmarks is achieved by... **View more**

Metadata

Abstract:
In this paper, we propose a novel framework for expression recognition by using salient landmarks induced shape signature. Detection of effective landmarks is achieved by appearance based models. A grid is formed using the landmark points and accordingly several triangles within the grid on the basis of a nose landmark reference point are formed. Normalized shape signature is derived from grid. Stability index is calculated from shape signature which is also exploited as significant feature to recognize the facial expressions. Statistical measures such as range, moment, skewness, kurtosis and entropy are used to supplement the feature set. This enhanced feature set is fed into Multilayer Perceptron (MLP) and Nonlinear AutoRegressive with eXogenous (NARX) to differentiate the expressions into different categories. We investigated our proposed system on Cohn-Kanade (CK+), JAFFE, MMI and MUG benchmark databases to conduct and validate our experiment and established its performance superiority over other existing competitors.

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Publisher: IEEE

Texture signature based facial expression recognition using NARX

Publisher: IEEE

Asit Barman ; Paramartha Dutta All Authors

Abstract: Texture characteristics among the landmark points reflected in human faces are important features in the recognition of facial expression. In this paper, we propose a sal... **View more**

Metadata

Abstract:
Texture characteristics among the landmark points reflected in human faces are important features in the recognition of facial expression. In this paper, we propose a salient feature based facial expression on texture characteristics. Detection of effective landmarks are performed by appearance based models and corresponding texture regions are extracted from face images. Local Binary Pattern (LBP) is used to compute the texture feature. Texture feature is used for normalizing texture signatures. In addition, we introduce stability indices corresponding to texture features which are exploited as features in the present scope. Moreover, statistical features such as moment, skewness, kurtosis and entropy are also supplemented to the feature set. These salient features together are used as an input to Nonlinear AutoRegressive with eXogenous (NARX) for recognition of the human facial expression. The Cohn-Kanade (CK+), Japanese Female Facial Expression (JAFFE), MMI and MUG benchmark databases are used to conduct the experiments and the results justify the effectiveness of the proposed procedure.

Published in: 2017 IEEE Calcutta Conference (CALCON)

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A new enhanced secure anonymous communication with authentication and session key agreement in global mobility network

Publisher: IEEE

Prasanta Kumar Roy ; Krittibas Parai ; Sathi Ball ; Bipin Kumar All Authors

Abstract: Recently, several protocols have been proposed to accomplish user authenticity with proper session key establishment in Global Mobility Network. Unfortunately, some of th... **View more**

Metadata

Abstract:
Recently, several protocols have been proposed to accomplish user authenticity with proper session key establishment in Global Mobility Network. Unfortunately, some of them still suffer from various security threats and high computational complexity. This article demonstrates a new enhanced two-factor authentication scheme for secure anonymous communication to mutually authenticate the communicating parties and to establish a proper session key between them. The major contributions of this article are 1) to achieve all kind of security goals and 2) to effectively reduce the computational complexity. The underlying construction is developed using Elliptic Curve Cryptography (ECC) along with light-weight processes to ensure the resistibility against well-known security threats and improved computational complexity. The protocol is implemented using HLPSL and formally validated using AVISPA to ensure that it has the ability to withstand several attacks. We have also compared the computational complexity of our protocol with some existing protocols to prove its efficiency.

Published in: 2017 Third International Conference on Research in Computational Intelligence and Communication Networks (ICRCICN)

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DOI: 10.36478/jeasci.2018.3294.3298

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References

Abstract

Energy Efficient Content Dissemination Architecture for Content Centric Network

Authors : Prasanta Kumar Roy, Sangram Ray and Mou Dasgupta

Abstract: Nowadays the Content Centric Networking (CCN) has gained much attention of research interest due to its content-based behavior. CCN seems to be an alternative to the IP-based networking, since, it replaces the host-to-host routing by name-based-routing. In this study, a new energy efficient content dissemination architecture has proposed for CCN to achieve its services such as content dissemination, content caching and managing trust only by the name of content.

A Secondary Study on Information Technology Applications in the Retail Sector

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Abstract

The importance of the impact of information technology, popularly termed as IT, for organizations around the world, especially in light of a very slow recovery from the global financial crisis, has amplified the need to provide a better understanding of the IT managerial and technical trends. The increased deployment of IT is creating new opportunities and challenges for retailers. The line between online and physical channels is getting blurred aimed at delivering a seamless customer experience regardless of the channel. IT not only improves the process of the enterprise, but also affects the business relationship with customers. IT includes among others such solutions as RFID, Kiosk Stores with Touch Screen, Electronic Shelf Labeling, and the Mobile Shopping System etc. Today's retailers need to enhance their IT capabilities because they are facing ever increasing competition poised to reach global level in India with the allowing of FDI in this sector. Further, consumer expectations have sharply increased demanding better and enhanced service. The retailers need to gear up to meet the expectations. On the other hand, technology, in form of both hardware and software tools, is also evolving rapidly to meet this challenge.

Key Words: *Information technology, Trend, Retailer, Customer, Service, Challenge*

A Simulation based Performance Analysis of Proactive, Reactive and Hybrid Routing Protocol

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Abstract— In this paper, study on MANETs for performance analysis and working principle concept on Mobile ad hoc network. To build up a conceptual over view on different type routing protocol algorithm and shortest path optimization technique different types of literature review has been done. Some case studies are being described in this paper to overview an idea on Proactive, Reactive, and Hybrid routing protocols and some optimization technique.

Keywords- Protocol, Manet, Routing, QoS, Optimization.

I. INTRODICTION

The limited resources in MANETs have made designing of an efficient and reliable routing strategy a very challenging problem. An intelligent routing strategy is required to efficiently use the limited resources while at the same time being adaptable to the changing network conditions such as: network size, traffic density and network partitioning (1). In parallel with this, the routing protocol may need to provide different levels of QoS to different types of applications and users(2).

II. DIFFERENTS TYPES OF ROUTING PROTOCALS.

A. Proactive Routing Protocol :

Each node in the network has routing table for the broadcast of the data packets and want to establish connection to other nodes in the network. These nodes record for all the presented destinations, number of hops required to arrive at each destination in the routing table. The routing entry is tagged with a sequence number which is created by the destination node(3,4).

Examples of proactive algorithms are:

- Optimized Link State Routing Protocol (OLSR)
- Destination Sequence Distance Vector (DSDV)
- The Cluster head Gateway Switch Routing (CGSR)
- Wireless Routing Protocol (WRP)

B. Reactive Routing protocol

The In order to reduce the control packet overhead, reactive routing protocol has been proposed. With reactive routing algorithm, a node does not have to maintain routs to all other nodes constantly (6,7).

Examples of reactive algorithms are:

- Ad hoc on-demand Distance vector (AODV).
- Dynamic source Routing (DSR).
- Temporally-Ordered Routing Algorithm (TORA).
- Associativity-Based Routing (ABR)

C. Hybrid routing protocols.

Hass et al. proposed a hybrid routing protocol called Zone Routing Protocol in the effort to combine the features of proactive and reactive protocols. The routing is initially established with some proactively prospected routes and then serves the demand from additionally activated nodes through reactive flooding (8,9).

Examples of hybrid algorithms are:

- Zone Routing Protocol (ZRP).
- Adaptive Distance Vector Routing (ADV).
- Sharp Hybrid Adaptive Routing Protocol (SHARP)

D. Optimized Link State Routing Protocol (OLSR)

OLSR is a proactive link state routing protocol designed for MANET and VANET, which uses hello and topology control (TC) messages to discover and then disseminate link state information throughout the mobile ad -hoc network Individual nodes use this topology information to compute next hop destinations for all no des in the network using shortest hop forwarding paths. This protocol has been chosen for a series of features that make it suitable for highly dynamic ad hoc Networks(10, 11, 12).

Study on the Complex Dynamics of a Single Loop Optoelectronic Oscillator

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***Abstract*—The present literature reports a study on the dynamics of a single loop optoelectronic oscillator. It has been observed that with the variation of the delay parameter the system depicts some complex behavior like limit cycle oscillation through Hopf bifurcation, chaotic oscillation.**

Keywords—Optoelectronic oscillator; Nonlinear dynamics; Delay differential equation

I. INTRODUCTION

Optoelectronic Oscillator (OEO) is an efficient photonic oscillator to produce ultra pure microwave signal. As the spectral purity of microwave signal produced by an OEO is superior compared to the other oscillators, this oscillator has a very promising application in radar, GPS, signal processing etc. The inherent ability of producing spectrally pure microwave signal relies on an innovative energy storage principle based on long low loss optical fiber delay lines [1, 2, 3]. Therefore the OEO belongs to the electro- optical system with delayed feedback. A nonlinear system with delay becomes infinite dimensional and various complex phenomenon like, bifurcation, chaos, hyper chaos, multi stability amplitude death can be observed in the system [4, 5] etc.

In recent years several attempts have been taken to study the complex dynamics of an OEO [6, 7] etc. In all these literatures the study has been carried out by considering gain as a control parameter. However nothing has been reported on the dynamics of an OEO by choosing time delay as a control parameter. In the present paper a mathematical model of a single loop OEO (SLOEO) has been developed to study the nonlinear dynamics of the oscillator with the variation of delay.

The paper is organized in the following way, section II contains the description of the system, derivation of the system equation is performed in section III, the numerical results are given in section IV and finally the paper concludes in section V.

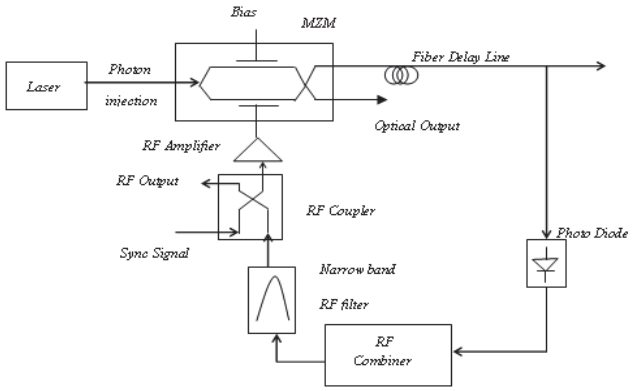

Figure.1 Basic configuration of an Optoelectronic oscillator

II. SYSTEM DESCRIPTION

Figre.1 shows the configuration of an SLOEO. The basic architecture of the OEO starts with a continuous wave laser which is fed in to an electro optic modulator. The optical output of the modulator is then detected by a photo detector after passing through a long optical delay line which is then amplified and passed through an electrical band pass filter (BPF). The output from the BPF is fed back to the electrical port of the electro optic modulator.

III. DERIVATION OF THE SYSTEM EQUATION

The transfer function of the BPF can be written as [9]

$$\frac{1}{G(s)} = 1 + Q\left(\frac{s}{\omega_0} + \frac{\omega_0}{s}\right) \tag{1}$$

Let us assume that the RF input to the MZM is $V_{in}(t) = V(t)e^{j(\omega_0 + \theta(t))}$ where $V(t)$ is the amplitude of the signal with free-running frequency ω_0 and the initial

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Synthesis of Silicon Nanowire and Carbon Quantum Dot Hybrid Nanostructure and Study of Its Photoresponse Property

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Abstract— **One and zero dimensional nanostructures and related hybrids have been extensively studied for their possible application in different electronic devices like sensors and solar cells. Here the synthesis of n type Silicon nanowire and water soluble Carbon quantum dot nanostructures by chemical synthesis processes have been reported. Thick layers of Carbon quantum dots on top of n type Silicon nanowires were deposited by spin coating process and thus forming hybrid nanostructures. The hybrid samples were characterized by FESEM and HRTEM. The photocurrent property of the as prepared hybrid samples were studied in details for possible application in photovoltaic and optoelectronic devices.**

Keywords— *One and zero dimensional nanostructures, Silicon Nanowire (SiNW) and Carbon Quantum Dots (CQDs) hybrid nanostructure, Photoresponse Property, Photovoltaic, Optoelectronic devices and sensors .*

I. Introduction

Silicon is considered to be the most desired material for electronic devices and VLSI circuits due to its different favorable properties. On the other hand Carbon based nanostructures like Carbon nanotubes (CNTs) and Carbon quantum dots (CQDs) have recently gained attention of the researchers for their unique structural, electrical and mechanical properties [1-2]. Especially many researchers are working in the synthesis and applications of Quantum Dots (QDs) [3]. QDs are considered to be nanomaterials with a dimension in the range of 1-10 nm. Both semiconducting and organic QDs like CdSe QDs and Carbon quantum dots (CQDs) have shown remarkable optical properties. The quantum dots are characterized by quantum confinement effect and tunable particle size leading to the different fascinating application like in solar cells and bioimaging applications [4].

Compared to the semiconducting QDs the organic QDs have many advantages. The synthesis technique to produce Semiconducting QDs often requires multiple steps and hazardous materials. But Carbon Quantum Dots (CQDs) can be produced from natural resources through easy synthesis processes. In our previous work we have produced CQDs by simple hydrothermal technique followed by centrifugation [5]. The size and the dimension of the QDs can be controlled by controlling different parameters while fabricating the QDs. Thus the properties of the QDs can be tailored by varying different synthesis conditions. It is known that with the increase of synthesis temperature the size of the quantum dot vary. So to study the effect of the temperature on the QDs and its subsequent effect on the photoresponse property, the CQDs were prepared with two different temperatures.

Silicon nanowire (SiNW) on the other hand has been successfully used in different sensors and solar cells [6]. Especially hybrid nanostructures of SiNWs and other inorganic materials have shown remarkable phovoltaic devices and photodetectors [7].

Here we are reporting the synthesis of the n type Silicon nanowire (nSiNW) by chemical etching process and the synthesis of the water soluble CQDs by hydrothermal process. Then a layer CQD was deposited on the surface of the SiNW by spin coating for multiple times. The as prepared hybrid nanostructured samples were characterized by field emission scanning electron microscope (FESEM, Hitachi, S-4800), high resolution transmission electron microscopy (HRTEM, JEOL-JEM 2100) and custom built photoresponse measurement system.

II. Synthesis of N type Silicon Nanowire and Carbon Dots Hynrid Nanostructure

Water soluble CQDs were produced from sucrose by a simple low-temperature hydrothermal process followed by centrifugation. In a simple process, water and ethanol were taken in a Teflon lined autoclave with a stainless steel jacket

Hydrothermal Synthesis of Carbon Quantum Dots and Study of Its Photoluminecence Property

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Abstract— **Different carbon nanostructures have attracted the fascination of the researchers due to their possible application in optoelectronic and bioimaging applications. In this work, the synthesis of water soluble carbon quantum dots (CQD) is reported. The quantum dots are produced by a simple hydrothermal technique followed by centrifugation process. The structures of the prepared carbon dots were studied by field emission scanning electron microscope (FESEM) and high resolution transmission electron microscope (HRTEM). The photoluminescence property of the as prepared sample was studied in details.**

Keywords—Hydrothermal synthesis, Carbon Quantum Dots (CQDs) , Photoluminesence Property, Excitation dependent PL propert, Chromaticity.

I. INTRODUCTION

Since the last few years nanostructured materials are being investigated for their different favorable properties. Carbon based materials have reportedly being studied for their optical, electrical and mechanical properties etc. Quantum dots are a member of this nanostructured family having dimension between 1 to 10 nm. Carbon quantum dots (CQDs) which belong to the family of Carbon dots (CDs) also have similar dimension. Semiconducting quantum dots have also shown remarkable properties especially optoelectronic properties. But the synthesis technique to make semiconducting quantum dots is a complex one. Compared to the semiconducting quantum dots, CQDs require less complex and yet environment friendly synthesis technique [1]. CQDs have been synthesized from different natural resources [2, 3]. Here we are reporting the synthesis of CQDs by simple hydrothermal technique followed by centrifugation [4]. The synthesized CQD samples have shown excellent photoluminescence (PL) property.

II. SYNTHESIS AND CHARACTERIZATION OF CARBON DOTS

Water soluble CQDs are synthesized from sucrose by a simple low-temperature hydrothermal process. In a typical process water and ethanol were taken in a Teflon autoclave with a stainless steel jacket. Later sucrose was added to the solution. The autoclave was then kept in an air oven. The temperature of the oven was kept around 175-180 ^{0}C for more than two hours. The autoclave was then left to cool down naturally. The solution became yellowish in color. Later the solution was centrifuged at 16000 rpm. The solution was stable even after months of preparation. The synthesized CQD samples were studied in details by FESEM (Hitachi, S-4800) and HRTEM (JEOL-JEM 2100) and Shimadzu RF5301 spectro-fluorometer.

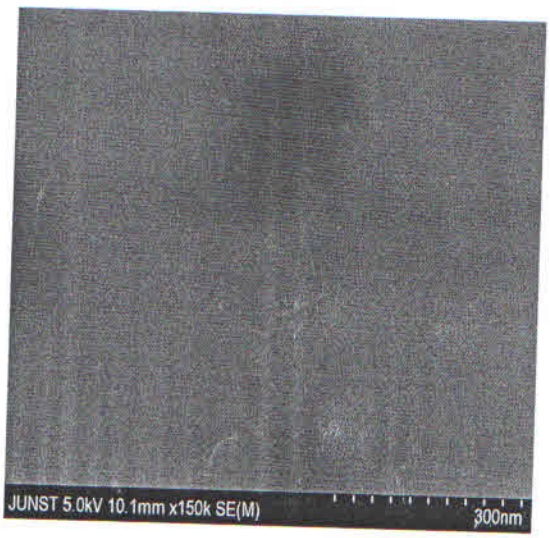

Fig.1: FESEM image of the CQD Sample

III. CHARACTERIZATION BY FESEM

The CQD samples were characterized by FESEM (**Fig.1**). The dimension of the CQDs was so small that they are almost out

Autonomous Navigation and 2d Mapping Using SONAR

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***Abstract*— This paper deals with a small compact robot that can autonomously navigate in an unknown indoor environment and at the same time construct a real time 2D map of the environment. The entire system consists of a robot and an application that is used for monitoring and mapping. The map is constructed based on 3 SONAR readings and the heading of the robot is determined by a single axis digital compass. Sonar readings are sent by the robot to the application which processes the data for mapping the path traversed. The robot is a standalone system and the autonomous navigation is done by the on-board controller. In this method, we presented the grid based mapping system and by the end of the robot's run, we obtained a 2D occupancy matrix of the path followed by the robot and its environment. Sonar readings were filtered using the Kalman filter and thus accuracy was better. The technique also implemented a stack of the path followed which can be backtracked. It can also operate in manual mode.**

Keywords*— *Autonomous, Mapping, Navigation, Occupancy matrix, Robot.

I. INTRODUCTION

The main aim of this system is to develop a bot that is both capable of operating autonomously and manually and also plot a 2D map of the environment. The system uses three sonar readings and based on the readings, it localizes itself in the environment. A digital compass ensures that the heading is maintained on-course.

The main components of the system are the bot itself and the software application that performs the processing of the raw data to be converted to a 2D map. The system is wireless and has a range of 300 metres. This paper will deal with the hardware setup, the software developed and the algorithm used for navigation. Unlike conventional 360-degree scanning, this paper revolves around scanning of 3 points. Left, Right and front. This reduces the scanning time significantly at the same time the accuracy is retained.

The robot performed a discrete motion pattern. The interval between two moves is utilized in transferring the data between the bot and the application. The mapping algorithm is based on two main parameters. The first parameter is the three distance values obtained by the sonar and the second is the heading value obtained from the digital compass.

This paper also deals with the control mechanism used for the robot control and more precisely the motor control and the different hardware used for the same. The robot developed uses HCSR04 modules for mapping however these cheap sensors cannot produce a detailed map required for full SLAM [2]. Thus our project was tested in a simulated indoor environment. The results that yielded were satisfactory. Also the robot was paired with a wpf application for monitoring. The custom made Windows presentation foundation (WPF) app plays a major role in monitoring the bot and plotting the map. Initially a Windows phone was planned to be used as a digital compass and at the same time obtain GPS reading, while developing the app for Windows Phone, it was found that bluetooth connectivity with Arduino and Windows phone was possible but the system was not stable and the app crashed repeatedly. The present robot replaces the use of a Windows Phone app by a digital compass to get the heading. Currently, a GPS wasn't used for navigation and it relied only on digital compass' readings. The destination heading was hard-coded and the robot moved until and unless a stop button was pressed in the wpf application.

II. ARCHITECTURE OF THE SYSTEM

The figure below represents the architecture of the entire system.

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An Active Power Spot Price based Approach for Congestion Management by Optimal Allocation of TCSC in Competitive Power Market

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***Abstract*—Congestion management is one of the most significant issues for secure and reliable system operations in a deregulated electricity market. This paper presents an effective approach for optimal allocation and optimal sizing of Thyristor Controlled Series Compensator (TCSC) to reduce the congestion in day-ahead power market. The proposed optimization approach is based on a factor called 'Active Power Spot Price Index' (APSPI) which reduces the solution space effectively and helps to determine the best location of TCSC in the system. Additionally, Locational Marginal Pricing (LMP) has also been demonstrated in this work considering the best chosen location of TCSC. The proposed approach is carried out on modified IEEE 14-bus and IEEE 118-bus systems to test and validate the results.**

Keywords—Deregulated Power Market, Active Power Spot Price Index, Congestion Management, TCSC.

I. INTRODUCTION

The deregulation or unbundling of electricity power markets have a very large impact on almost all power systems around the world. It introduced competition in power trading and also resulted in an increased volume of power transactions. In many electricity markets, generation companies (GENCOS) and distribution companies (DISCOS) negotiate power transactions independently. This condition can lead to an unexpected volume, direction and length of power flow through some transmission paths. The current transmission networks, however, may not be able to accommodate such trades. It also suffers from extensions by the relative diminish in transmission investment [1], problems in acquiring the right mechanism for building new transmission systems and the concern regarding the environment. These may create congestion and violate the system security. Hence the independent system operator (ISO) has the responsibility to relieve the congestion, so that the system is maintained in secure state [2], [3]. For this, the ISO can either go for cost free means or non-cost free means. Flexible AC transmission system (FACTS) devices are considered as cost free means.

Recently there has been growing interest for optimal placement of FACTS devices for achieving different objectives related to the congestion management. Sajad *et al.* [4] present an optimization approach to minimize the system congestion by optimal placement of FACTS devices (STATCOM and SSSC). Rashed *et al.* [5] deals with the application of GA and PSO, for optimal location and optimal parameter setting of TCSC under single line contingency. Reference [6] presents a method to determine the optimal location of TCSCs to minimize the system total loss by using the real power performance index. Hashemzadeh *et al.* [7] presents a PSO based algorithm for locating series FACTS devices in deregulated electricity markets in order to reduce and manage congestion. Reference [8] presents a multi-objective congestion management approach to minimize transmission congestion cost and emission of the system. Paper [9] demonstrates a multi-objective framework for congestion management to optimize total operating cost, voltage profile and transient stability margins. Congestion management by optimal placement of TCSC in an electrical system by considering the non-smooth fuel cost function and penalty cost of emission has been presented in [10].

The review of literature reveals that the optimal placement of FACTS is great concern for power system researchers and planners. However, to the best of our knowledge, no attempt has been made to suggest a reliable, efficient and less solution space algorithm for determination of social welfare as well as rating, cost and cost recovery of FACTS devices with congestion management in a deregulated power market.

This paper proposes an optimization approach to placement of TCSC in proper location for congestion management. In this work, MATPOWER is used for OPF formulation. The paper also demonstrated that the overall generation cost and spot prices which are reduced with the incorporation of TCSC in the system.

In [11,13], the appropriate size, best location and setting of FACTS devices are determined in deregulated electricity markets but congestion management is not considered in these papers. This paper is concern on the static aspect of the TCSC location, where the placement of TCSC has been done for reducing the congestion. Congestion occurs due to the line overload and/or voltage limit violation. When the apparent power flow of any line reaches to the specified value, the line is said to be congested.

Sizing of FACTS devices is also important because cost proportional to the size of the FACTS devices. In case of TCSC, once the location is optimized, the size of TCSC can be obtained

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Profit Maximization with Integration of Wind Farm in Contingency Constraint Deregulated Power Market using Moth Flame Optimization Algorithm

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***Abstract*— Contingency is one of the most important issues in deregulated electricity market. Generator rescheduling or integration of FACTS devices are the most common techniques for mitigating the contingencies in modern power system. Recently major concern is given for renewable energy generation system. In this paper, renewable energy like wind farm (WF) generation is used for maximizing the profit as well as mitigating the contingency by minimizing the fuel cost and system losses. Line outage contingency index (LOCI) is used for finding the most critical line in the system. Contingency Constraint Optimal Power Flow (CCOPF) with the help of Moth Flame Optimization (MFO) algorithm is used to solve the problem. The proposed method has been tested on modified IEEE 30 bus system to analysis the effect wind farm in system. The obtained result shows that wind farm generation is very useful for minimizing the value of LOCI and maximizing the profit in deregulated electricity market.**

Keywords—Contingency constraint optimal power flow (CCOPF), line outage contingency index (LOCI), moth flame optimization (MFO) algorithm..

I. INTRODUCTION

Restructuring of electricity market creates huge competition in generation as well as distribution or customer side. As results, lots of pressure has come to the conventional generators and transmission lines of the existing system. It is because of electricity demand has increases day by day after deregulation. Due to the continuous increase of electricity generation and demand in existing transmission system network, security assessment and control has became one of the most important issues in deregulated electricity market. Security assessment means determining the network operating state i.e it is operating normal state or contingency state. Several research work related to contingency analysis have been reported in the recent past years [1-4].

If the network is in contingency state, generators are needed to reschedule their generation capacity to mitigate the contingency with considering the cost to the consumer in a reasonable limit. In ref [5], authors discussed double sided optimal bidding strategy under transmission congestion. In ref [6-7], authors minimized the cost of purchasing power in electricity market by introducing the demand side bidding strategies. All most all the previously reported literatures on contingency are based in pool electricity market. But there are very few works available in bilateral power market which has been applied to alleviate contingency. In ref [8], author explained the congestion management strategy using hydro thermal combination under secure bilateral electricity market.

Renewable energy sources (RES) like solar photo voltaic (PV) and wind farm integration in modern power system are attracting more attention because of their excellent property which reduces green house emission. In modern power system, transmission planning is one of the most challenging tasks due to the incorporation of renewable energy sources. Wind power plays very important role in power system security enhancement as well as cost and loss minimization [9]. So, for analysis and optimization of power system, wind farm formulation is very much essential [10]. To determine the control parameter setting in power system, optimal power flow (OPF) is used by power system planner and operator as an optimization tools. It is mainly used for solving the static optimization problem but also used to solve the security constraint power system problem [11-12].

Until now, to the best of our knowledge, no research work has carefully studied on integration of wind farm in competitive power market under contingency scenario. Therefore, in this paper wind farm is integrated in power system to overcome the line overload due to the line outage contingency of the system. Moth flame optimization (MFO) algorithm with contingency constraint optimal power flow (CCOPF) is used to solve this problem. Modified IEEE 30 bus system is used as a test system to carry out the simulation of the proposed method.

II. CONTINGENCY INDEX

Partial or total outage of generator or transformer or transmission line is called contingency. Contingency may

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Moth Flame Optimization based Optimal Bidding Strategy under Transmission Congestion in Deregulated Power Market

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***Abstract*— In a deregulated electricity market, bidding is a complex task because of generation and demand uncertainty. Recently major concern is given for maximizing the profit of the customers. Therefore, bidding is very important work for Independent System Operator (ISO) to maximize the profit of the market participant. In this paper, optimal bidding strategy of supplier under congested system has been proposed to maximize the profit of the market participant considering double sided bidding. Generator rescheduling based on the Generator Shift Factor (GSF) has been adopted in this paper for mitigating the congestion of the system. Moth Flame Optimization (MFO) algorithm has been used to obtain the solution of the bidding problem. A modified IEEE 30 bus system is used to analyze the bidding strategy in deregulated electricity market.**

***Keywords*— Bidding Strategy, Market Clearing Price (MCP), Generator Shift Factor (GSF,) Moth Flame Optimization (MFO) Algorithm .**

I. INTRODUCTION

Deregulation is mainly introduced in electricity market to maximize the profit of market participants. To maximize the profit of each participant in deregulated power market, bidding strategy is developed. Based on the bidding model, electricity bidding is mainly classified into two types: single sided bidding and double sided bidding. In single sided bidding model, price determines by price quantity supplied by suppliers. In double sided bidding model, both buyers and sellers are submitted bid to ISO and ISO determines the marginal price to maximize the profit of each participant. Several research works related to bidding strategies using optimization method have been reported in the recent past years. Based on the Lagrangian Relaxation Method (LRM), optimal scheduling and bidding strategy is determined [1]. To developed optimal bidding strategies in electricity market, Nonlinear Programming (NLP) is utilized [2]. In ref [3], authors have investigated the bidding strategies of generation companies considering different bidding segment of the Generation Companies (GENCOs).

Strategic bidding and rival bidding behavior of market participant is found by using Monte Carlo Simulation (MCS) method [4]. In ref [5], authors have discussed optimal bidding strategy of supplier considering double sided bidding market under transmission congestion using Bacteria Foraging Optimization (BFO) algorithm. In ref [6-7], authors have minimized the cost of purchasing power in electricity market by introducing the demand side bidding strategy. In ref [4], GENCOs bidding strategy was developed considering separate supply function for each hour in a day-ahead market using genetic algorithm. Electrical market is settled based on the Locational Marginal Price (LMP) of the system. Optimal GENCO bidding strategies of electricity market has been established by using agent based approach and Numerical Sensitivity Analysis (NSA) technique [8]. In power market, optimal bidding is depends on the bidding revenue, expected imbalance and operation cost of the system. In ref [9], author presents an auction based market for consumer payment minimization under pool based day-a-head electricity market. Nash equilibrium bidding strategy has been explained in a bilateral power market to determine the optimal bidding strategy of the market participant [10].

In deregulated power market, electricity price determined by the balance of economic supply and demand. Due to the congestion, deviation from the balance of supply and demand may reduce the benefit of market participant. Congestion usually occurs in power system due to line outage or generator outage or transformer outage or increase in demand of electricity. Therefore congestion management plays a vital role in economics of deregulated power market. Tengshum and Kevin have discussed the optimal bidding strategy for electricity supplier under congested environment [11]. In ref [12], authors have minimized the congestion using generator rescheduling technique. In ref [13], authors have proposed the generator rescheduling based congestion management approach with integration of pumped storage hydro unit. LMP is one of the most important economic term in deregulated power market. In ref [14], zonal congestion management approach based on the LMP under deregulated electricity market has been discussed.

The aim of this paper is to develop an optimal bidding strategy for supplier in unconstrained market scenario considering double sided bidding in a congested power system. GSF is considered here to reschedule the generators for mitigating the congestion and find out the optimal settings of suppliers under congested environment. In order to get the

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Optimal Demand-Side Bidding Using Evolutionary Algorithm in Deregulated Environment

Subhojit Dawn, Sadhan Gope, Prashant Kumar Tiwari and Arup Kumar Goswami

Abstract This paper presents an efficient and optimization proficiency for minimization of fuel cost and losses of an electrical system in a completely deregulated power system. Single-side bidding and double-side bidding both cases are considered in this paper with the help of sequential quadratic programming (SQP) and evolutionary algorithm like firefly algorithm (FA) and cuckoo search algorithm (CSA) for checking the effectiveness of the presented approach. Modified IEEE 14 bus test system and modified IEEE 30 bus test system are considered for validating and analyzing the impact of proposed approach.

Keywords Deregulation · Firefly algorithm · Cuckoo search algorithm · Sequential quadratic programming · Optimal power flow

1 Introduction

In the last 40–50 years, electricity companies have divided into some parts which are monopoly in nature, for which there is a competitive attitude build up among these parts of the electricity companies, which creates a market environment for electricity. The demand of electricity is increased day-by-day throughout the world in a rapid manner. Every consumer wants to purchase the electrical energy with a

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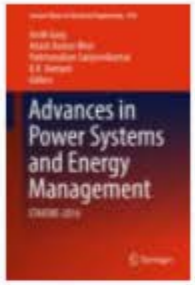
M. Pant et al. (eds.), *Proceedings of Fifth International Conference on Soft Computing for Problem Solving*, Advances in Intelligent Systems and Computing 436, DOI 10.1007/978-981-10-0448-3_38



Advances in Power Systems and Energy Management pp 355-365 | Cite as

Modeling of the State Space Vector PWM (SVPWM) Based STATCOM for Voltage Improvement in the Transmission Line

Authors | Authors and affiliations

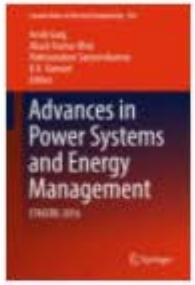
Rubi Kumari, Chitrangada Roy

Chapter
First Online: 28 November 2017

Part of the Lecture Notes in Electrical Engineering book series (LNEE, volume 436)

Abstract

In the present era, the increase in population has led to the increase of load as a result the generated voltage is not equal to the received voltage. This has affected the stability of the power system. Flexible Alternating Current Transmission Devices shortly termed as FACTS devices came into use for better voltage regulation and stability in the power system. A Static



Advances in Power Systems and Energy Management pp 465-476 | Cite as

Adaptive PI Control of STATCOM for Stability Improvement of Power System

Authors | Authors and affiliations

Rubi Kumari, Chitrangada Roy

Chapter
First Online: 28 November 2017

Part of the Lecture Notes in Electrical Engineering book series (LNEE, volume 436)

Abstract

The power system today has become a very complicated network with thousands of generating stations, distribution and load centres which are interconnected through power transmission lines. So, the sudden increase of load in order to meet the demand leads to voltage instability in the power system. For overbear the steady-state control difficulties in power systems, Flexible

An analysis of power-factor-correction boost converter's nonlinear dynamics through bifurcation diagrams

Publisher: IEEE

Koushik Chatterjee ; Arnab Ghosh ; Pradip Kumar Saha ; Arup Das **All Authors**

Abstract:
This paper reflects the study of a Power-Factor-Correction (PFC) boost converter's nonlinearity. A peak current controlled boost converter is simulated in continuous conduction mode (CCM) to study the dynamics through the bifurcation diagrams. The study shows that with changes of certain parameters the bifurcation and chaotic state may occur. The bifurcation diagrams indicate the stable zone of various parameters of the circuit which is desired to be selected. The bifurcation map is obtained by varying input voltage and reference current as variable. Discrete state space has also been considered for observing the periodicities of state variables and detecting the route to chaos.

Published in: 2016 International Conference on Intelligent Control Power and Instrumentation (ICICPI)

Sustainable Community Development through Ecotourism : A Case Study of North Bengal and Sikkim Region

Dr. Shuvendu Dey[1] and Analjyoti Basu[2]

1. Asst. Professor and Mentor, Dept of Business Administration, Siliguri Institute of Technology, Salbari, Sukna, Siliguri,
2. Student, Doctoral Program, Entrepreneurship Development Institute of India, Gandhinagar, Gujarat

ABSTRACT ■ The paper assesses the North Bengal and Sikkim region, identifies the problems and scrutinizes the viability of ecotourism development in the region. A study tour of relevant spots reveals that local interest is sadly weakened by governance condition and bureaucratic apathy. However, it also confirms existence of social benefits in the form of strengthening local identities from local ownership of enterprises. The findings of the study confirm the disconnection between the macro policies and the micro management. It is to address these weaknesses and gaps that the paper highlights the importance of public policy to integrate all the sectors under a common goal of sustained community development. The paper stresses on multidiscipline integration and community participation to ensure continuity of community development. The recommended strategy is to put in place public policies to facilitate local community participation for the responses on the changes experienced, so that public policy can respond effectively to the changes and needs as to ensure sustainability of development. The paper identifies the criticality of public policy for integrating the multidiscipline under a common goal and approach. The paper attempts to address the need areas, mitigate the risks and formulate a policy strategy to attain the goal of sustainability.

Keywords: North Bengal and Sikkim, Ecotourism, Public Policy, Community, Sustainable Development

INTRODUCTION:

The northern most districts of North Bengal and Sikkim, and the seven northeastern states of India make up the country's one of the richest biodiversities adequate to provide livelihood to millions in the region. The region is a gateway of India to South East Asian region. The region is also economically and geo-politically very important. The superb beauty of the eastern Himalayan region, pristine environment and off-the-beaten path destinations, peripheral and isolated region located near national borders or in areas of difficult climate and topography has attracted intellectual debate seeking ways and means of development through a shift from impersonal, traditional tourism to establishing close rapport between visitors and the local community. Instead of using touristic commodities these tourists prefer to use or share the services of local people. The focus in these travels is the preserved natural environment, authentic atmosphere and cuisine, and local traditions. This form of tourism, termed as ecotourism, is nowadays regarded as a key to sustainable development. It is also known as special interest tourism.

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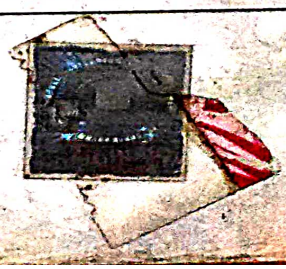

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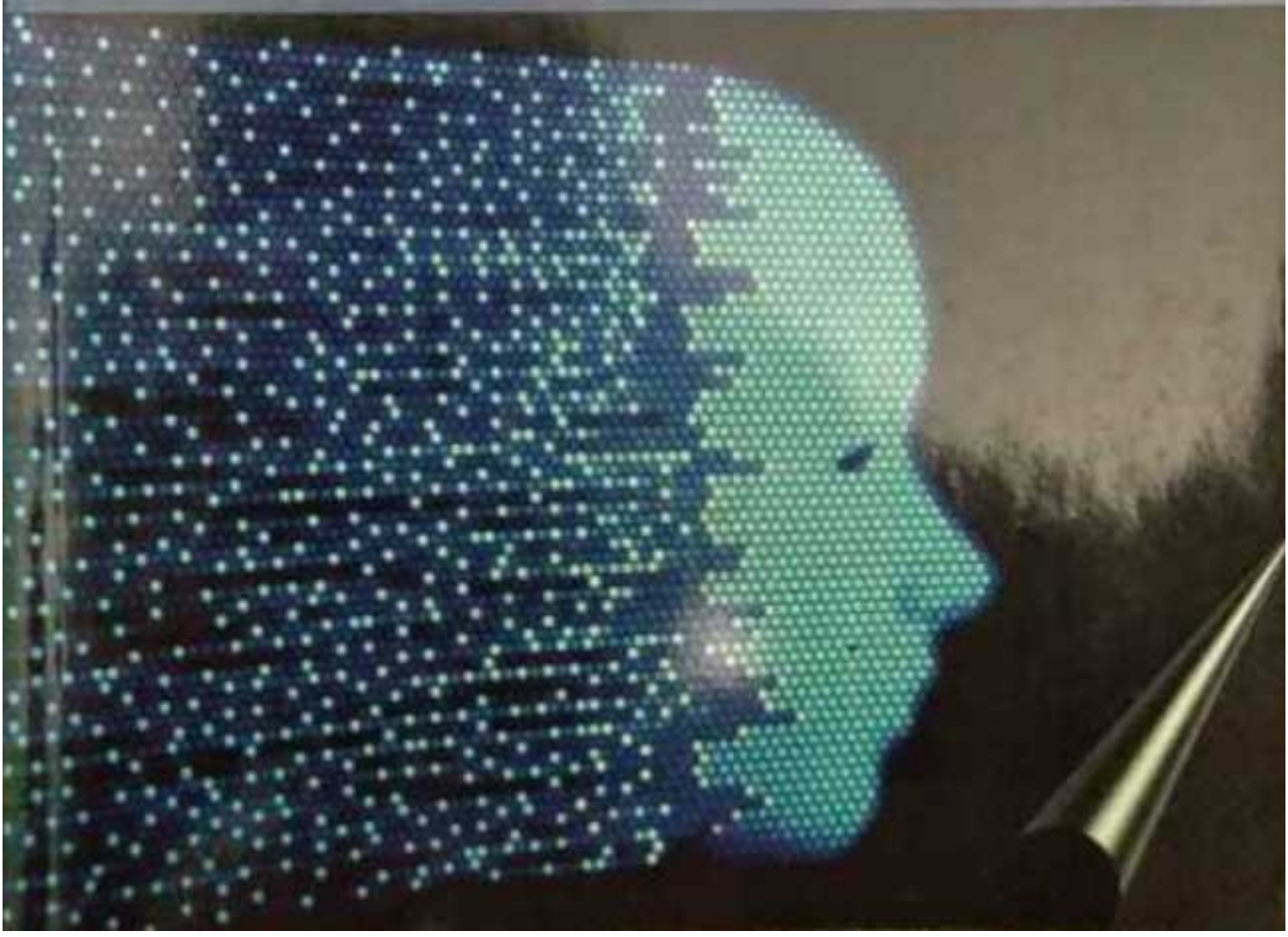

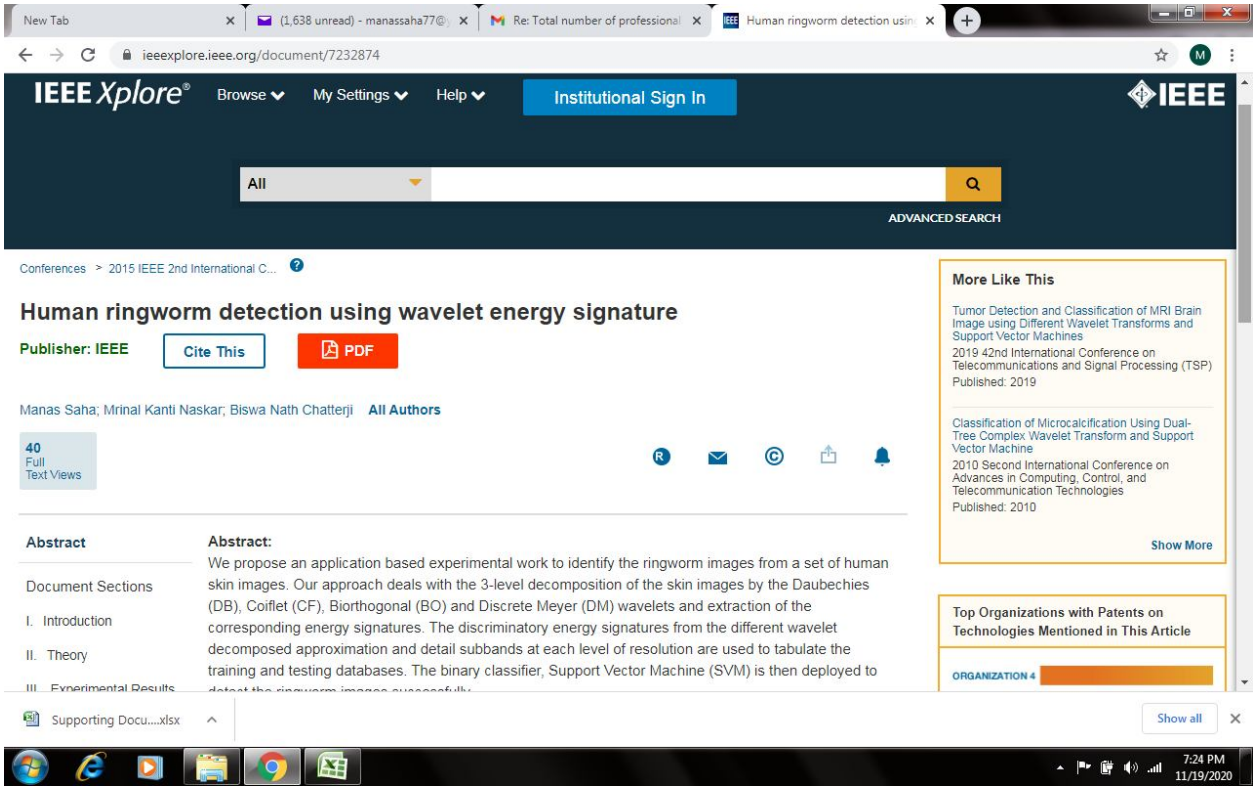
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II. Theory
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Abstract:
We propose an application based experimental work to identify the ringworm images from a set of human skin images. Our approach deals with the 3-level decomposition of the skin images by the Daubechies (DB), Coiflet (CF), Biorthogonal (BO) and Discrete Meyer (DM) wavelets and extraction of the corresponding energy signatures. The discriminatory energy signatures from the different wavelet decomposed approximation and detail subbands at each level of resolution are used to tabulate the training and testing databases. The binary classifier, Support Vector Machine (SVM) is then deployed to
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Advanced Computing and Systems for Security pp 101-109 | Cite as

Detection of Diabetic Retinopathy Using the Wavelet Transform and Feedforward Neural Network

Authors | Authors and affiliations

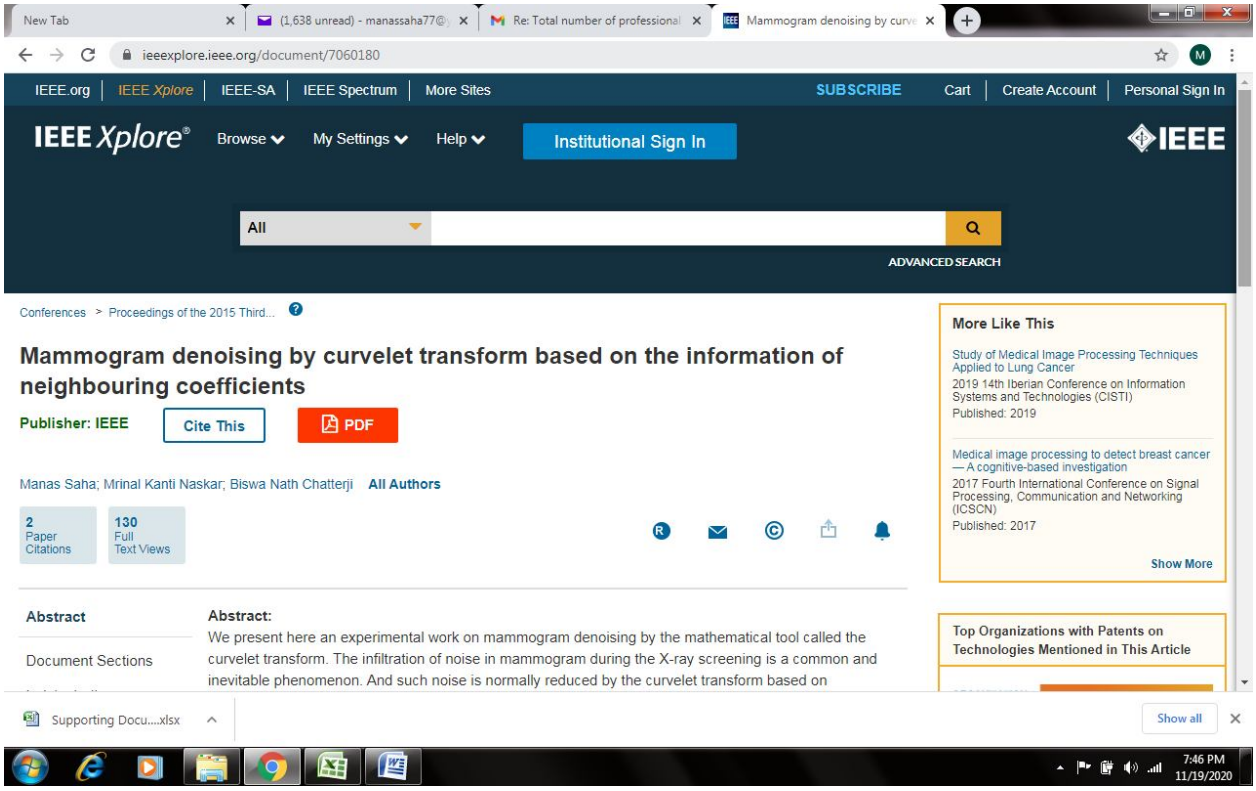
Manas Saha, Mrinal Kanti Naskar, B. N. Chatterji

Chapter
First Online: 03 November 2015

Part of the Advances in Intelligent Systems and Computing book series (AISC, volume 395)

Abstract

The early detection of diabetic retinopathy plays a significant role in modern ophthalmology. This experimental work presents the detection of diabetic retinopathy images by the implementation of the wavelet transform and feedforward neural network. The wavelet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Mammogram denoising by curvelet transform based on the information of neighbouring coefficients
Publisher: IEEE
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Abstract:
We present here an experimental work on mammogram denoising by the mathematical tool called the curvelet transform. The infiltration of noise in mammogram during the X-ray screening is a common and inevitable phenomenon. And such noise is normally reduced by the curvelet transform based on
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Information Systems Design and Intelligent Applications pp 327-335 | Cite as

Poisson Noise Removal from Mammogram Using Poisson Unbiased Risk Estimation Technique

Authors | Authors and affiliations

Manas Saha, Mrinal Kanti Naskar, Biswa Nath Chatterji

Conference paper
First Online: 21 January 2015

Part of the Advances in Intelligent Systems and Computing book series (AISC, volume 340)

Abstract

We present an experimental work on the denoising of mammogram with Poisson noise. Reviewing the literature, it is found that the denoising performance of the multiresolution tools like wavelet, contourlet and curvelet implemented on mammogram with Poisson noise is

Synthesis of Amorphous Carbon Nanotubes-MnO_2 flakeHybrids for Cold Cathode Application

SouravSarkar[a], DiptonilBanerjee[b],Nirmalya Sankar Das[a] and Kalyan Kumar Chattopadhyay*[a]

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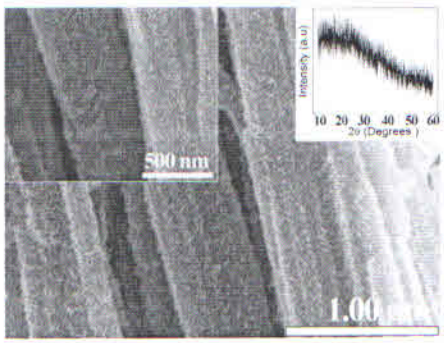
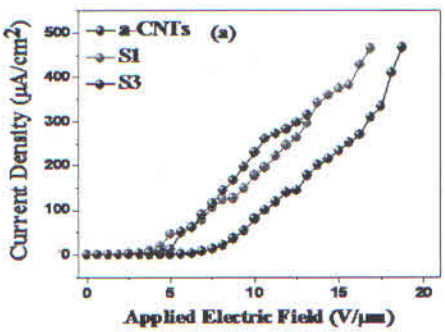
Presenting author:souravsarkars@gmail.com (S. Sarkar)

A simple approach has been implemented to synthesis amorphous carbon nanotubes (a-CNTs) and manganese oxide (MnO_2) hybrid nanostructure at temperature as low as ~250 ^{0}C in open atmosphere. Microscopic studies have revealed that the walls of the a-CNTs were coated uniformly by MnO_2nanoflakes. The composition of the as prepared sample was studied with the help of energy dispersive X-ray and X-ray photoelectron spectroscopy. Morphology of the as prepared pure as well hybrid samples have been studied by field emission scanning electron microscope as well as high resolution transmission electron microscope. XRD study together with the HRTEM images confirm the amorphous nature of the samples whereas microscopic analysis shows that the as prepared a-CNTs were uniformly coated with MnO_2nanoflakes. The electron field emission studies of the as prepared pure and hybrid samples were done in the high vacuum field emission set up.It is seen that the performance of the a-CNTs as cold cathode emitter has been enhanced greatly when MnO_2 nanoflakes were coated uniformly over it. The turn on field has been reduced from 7.17 to value as low as 3.82 V/mm with enhancement factor increasesfrom 2428 to 6965. The results have been explained due to enhanced surface roughness leading to higher enhancement factor and overall increase of emission sites. Thus the hybrid sample shows a truly multifunctional character improving theproperties of complete difference compared to the pure material





Keywords: Carbon nanotubes, Field emission, Hybrid Structure, Microscopic study
Preferred Mode of Presentation: Oral
Thrust Area Code: Engineered Materials for Industrial Needs

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This is to certify that Debajyoti Misra has Participated & Presented a paper (oral) in the Short Term Course on "Experimental Techniques for Materials Characterizations (ETMC-2015)" during Feb 27 – March 03, 2015 organized by the Department of Physics, National Institute of Technology Durgapur, India.

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(Dr. H. Choudhuri)

(Dr. P. Kumbhakar)

Coordinators

Dated the 3rd March, 2015 Durgapur

Fault Detection of Continuous Time Filter using Non-linear Feedback based OBIST

Manas Kumar Parai, Kasturi Ghosh and Hafizur Rahaman
School of VLSI Technology
Indian Institute of Engineering Science and Technology, Shibpur
Howrah, India

Abstract— **A new Oscillation Built-In-Self-Test (OBIST) methodology is developed to reduce test time and complexity in the testing of analog circuit. The technique is incorporated to test an op-amp based filter circuit. Circuit Under Test (CUT) is converted to a robust oscillator by introducing a nonlinear feedback path during test mode. The frequency of oscillation is processed by purely digital circuit which leads high precision of testing. The proposed OBIST is validated with simulation using Cadence. The technique offers minor area overhead and high fault coverage.**

Keywords—Analog circuit testing; Johnson Counter; Oscillation Built-in-self-Test; Schmitt Trigger.

I. INTRODUCTION

Built–In-Self-Test (BIST) is an efficient test methodology where test circuit, test pattern generator and output response analyser are built on-chip. But in general BIST structure, on-chip test pattern generator increases the area overhead [1]. In Oscillation Built-In-Self-Test (OBIST) method the CUT is transformed to an oscillator by connecting suitable feedback network. When any fault is encountered in the circuit, the frequency of oscillation is deviated from its nominal value from its fault free condition. The advantage of OBIST over general BIST is that it does not require costly test vector generator. Oscillation frequency exhibits digital property, so easily evaluated though highly precise test evaluation part of the decision making devices [2].

K. Arabi et al. [3] proposed a universal OBIST structure where the CUT is divided into a number of blocks and each one is converted to an oscillator by connecting suitable feedback network. Test points are selected using analog multiplexer. The frequency of oscillation is converted to number, which is compared with its nominal value. Any deviation out of the tolerable range is indicated by fail status due to faulty circuit. Testing of integrated Op-amp using oscillation test strategy is reported by K. Arabi et al. [4]. D. Arbet et al. [5-6] showed the computation of the tolerance band of oscillation frequency for their proposed OBIST, due to process variation. Some researchers used non-linear feedback elements [7-8] to generate steady oscillation in OBIST. Along with oscillation frequency, they also proposed a counter based measurement techniques for other parameters like amplitude, distortion, DC level etc. In this method, the precision of measurement in output is increased in cost of area overhead. G. Huertas et al. [9] proposed a low cost on-chip test strategy using first order sigma delta modulator and digital counters to measure the above mentioned parameters of the oscillation signal. Better accuracy of measurement is obtained due to precision in oversampling ratio. Test result is decided on the basis of this oversampling ratio. E. Romero et al. [10] reported design-for-testability (DFT) for switched capacitor filter using non-linear oscillator. The proposed scheme considers the adopted fault model described by C. Stapper et al. [11].

In this work, we propose a new testable design of second order low pass filter (LPF) which will work as normal LPF as well as oscillation based DFT circuit. The test circuit used here is very simple as compared to the circuits proposed earlier [2-3, 5-6, 12]. The proposed technique focuses on the catastrophic fault such as floating gate, short and open faults in LPF. These faults are inserted and resultant fault coverage is detected. Our proposed method is also capable of detecting parametric fault.

The paper is organized as follows: Section II presents the proposed OBIST methodology. Section III shows the result of fault simulation of second order LPF with our proposed methodology using Cadence software in 180 nm technology. Conclusion is given in Section IV.

II. PROPOSED OBIST METHODOLOGY

In our proposed OBIST the Second order Butterworth low pass filter (LPF) is transformed to an oscillator by providing a positive feedback through a high gain Schmitt trigger. It guarantees a 0^0 or 360^0 phase shift to fulfil the criteria for sustaining oscillation. Schmitt trigger gain is increased due to positive voltage added to the comparator circuit. The input voltage triggers the output every time, it either exceeds upper threshold voltage of $+V_{th}$ mv or goes below the lower threshold voltage of $-V_{th}$ mv. The circuit exhibits nonlinear property called hysteresis. Complete circuit diagram is shown in Figure1.

In normal mode the switch S1 is closed and the switches S2, S3 & S4 remain open. In test mode the switches S2, S3 & S4 are closed and S1 remain open. This arrangement ensures full utilization of all the components of CUT in the test mode [7].

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Acceptance Letter

Paper id :ESM465

Author Manas Kumar Parai[1], Banasree Das[2]

Congratulations!

We are pleased to inform you that the above-mentioned paper/case study has been accepted for –ICIRESM 15.Your paper will be published in proceeding of TMH and special issues of associated journal. Two different types kind of Hard copy of certificates will be provided to all authors (Conference Presentation, Journal Publication).

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Optical Synchronization of Microwave Signals in an Optoelectronic Oscillator

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***Abstract*— A single loop optoelectronic oscillator is synchronized in the optical domain by an external microwave signal. The system equation of such an oscillator has been derived. Normalized output voltage and frequency are calculated and the steady state output voltage as a function of time is studied. Theoretical results are presented in this short communication.**

I. INTRODUCTION

The configuration of an optoelectronic oscillator (OEO) is similar to a van der Pol oscillator. A van der Pol oscillator can be converted to an OEO by replacing the function of electrons by photons, the function of the grid by an electrical-optical (E/O) converter, the function of the anode by an optical-electrical (O/E) converter and finally the energy storage function of the LC circuit by a long optical fiber line.

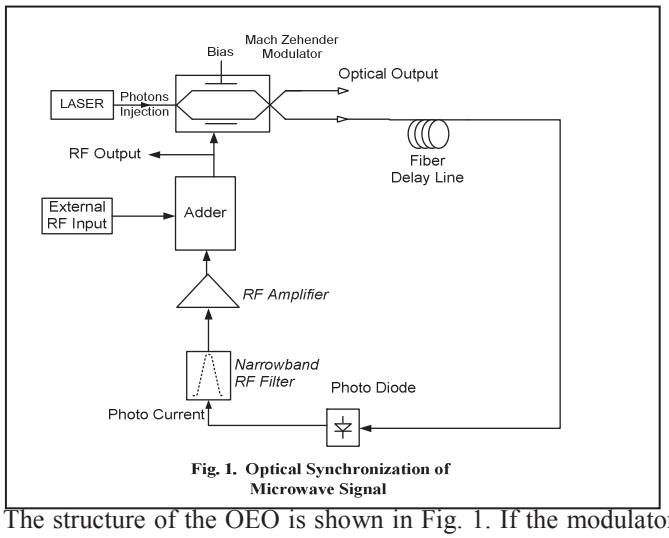

Fig. 1. Optical Synchronization of Microwave Signal

The structure of the OEO is shown in Fig. 1. If the modulator is properly biased and the small-signal loop gain is made larger than unity, then self-sustained oscillations are obtained [1,2]. The long delay line used in the oscillator can support many modes of RF oscillations. Mode spacing is inversely proportional to the delay length of the fiber. The electrical band-pass filter selects the frequency of oscillation by attenuating the other free running modes below threshold. In the proposed work, the basic philosophy is that despite the presence of strong non-linearity of the Mach-Zehnder modulator (MZM), there exists a stationary microwave signal '$v_{in1}(t)$' inside the loop [1]. This microwave signal is being injection synchronized by an external microwave signal '$v_{in2}(t)$' feeding the MZM. The different modes generated by the MZM for the signal '$v_{in1}(t)$' inside the loop will now be interacting with the modes produced by the MZM for the external RF signal '$v_{in2}(t)$' thus causing injection synchronization. A stationary microwave signal selected by the filter and satisfying the Barkhausen criterion will sustain in the loop.

II. SYSTEM EQUATION OF THE OEO

Let the RF input to the modulating grid of the Mach-Zehnder modulator (MZM) within the OEO is given by $v_{in1}(t) = V(t)e^{j[\omega_1 t+\theta(t)]}$, and the external RF signal feeding the MZM be represented as $v_{in2}(t) = V_2 e^{j[\omega_2 t]}$; where $\Delta\omega = \omega_1 - \omega_2$ is the detuning frequency between the two RF, 'V_2' is a dc amplitude and the instantaneous phase difference between '$v_{in1}(t)$ & $v_{in2}(t)$' is $\psi(t)$, i.e., $\psi(t) = \Delta\omega t + \theta(t)$. The output power of the MZM can be expressed as [1] $P(t) = \frac{1}{2}\alpha P_0\left[1-\eta\sin\pi\left(\frac{v_{in1}(t)+v_{in2}(t)+V_B}{V_\pi}\right)\right]$; where '$\alpha$' is the fraction of insertion loss of the modulator, 'V_π' is the half-wave voltage, 'V_B' is the bias voltage, 'P_0' is the input optical power, and 'η' determines the extinction ratio of the modulator. Therefore, the output voltage of the photo detector when the output of the MZ modulator shines on it is $V_0(t) = \rho R P(t-\tau)$; where '$\rho$' is the sensitivity and 'R' is the output impedance of the photo-detector. Hence, it is not difficult to show that the output RF voltage will be

$$V_0(t) = \frac{N\left[V(t-\tau)\right]}{V(t)} J_0\left(\frac{\pi V_2}{V_\pi}\right) e^{-j[\omega_1\tau+\theta(t)]} v_{in1}(t) + \frac{N'\left[V(t-\tau)\right]}{V(t)} J_1\left(\frac{\pi V_2}{V_\pi}\right) e^{-j[\omega_2\tau+\psi(t)]} v_{in1}(t) \quad (1)$$

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Design and Analysis of open loop model of a Permanent Magnet Synchronous Motor (PMSM) Drive

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Abstract-**This paper presents the development of an open loop model of a Permanent Magnet Synchronous Motor (PMSM) drive fed from a 3 phase bridge inverter and operating under self-control mode with the rotor position information. Permanent Magnet Synchronous Motors (PMSM) are widely used in AC servo drives because of its high torque to inertia ratio, high power density, high efficiency and power factor as compared to other conventional drive motors. The different performance indices of the system like speed, electromagnetic torque, phase voltage, phase current, rotor position etc. have been executed in MATLAB environment.**

Key words-Permanent Magnet Synchronous Motor (PMSM) Drive, Voltage Source Inverter (VSI), Rotor Position, MATLAB simulation.

I. INTRODUCTION

The reduced energy consumption is highly demand in motor drives for heating, ventilating, air conditioning and in different industrial drives. Permanent Magnet Synchronous Motors (PMSM) have been widely used in recent years in industrial drive applications ranging from small servo drives to high performance machine tool drives. The Permanent Magnet Synchronous Motor (PMSM) is a rotating electrical machine where the stator is a classic three phase stator like that of an induction motor and the rotor has surface mounted permanent magnets. In this regard, The Permanent Magnet Synchronous Motor is equivalent to aninduction motor where the air gap magnetic field is produced by a permanent magnet [1]. Thus with the development of permanent materials and control technology the PMSM is mostly used due to high torque/inertia ratio, high power density, high efficiency, reliability and easy for maintenance in different industrial applications. This model basicallyinvolves development of model of PMSM i.e. for machines having sinusoidal air gap flux distribution. The PMSM, therefore, has a sinusoidal induced emf and requires sinusoidal currents to produce constant torque. The rotor position information is very crucial for field oriented control. The coordinate transformation uses the value of the rotor position in order to handle the stator current vector projection in a rotor frame. For sensor based control sensors are used to indicate the position of the rotor. Permanent Magnet Synchronous Machine (PMSM) is a rotating electrical machine with a balanced three phase armature in its stator and a permanent magnet material in its rotor. Due to the absence of any slip ring-brush arrangement, the maintenance problem does not exist and the ruggedness also increases. Generally, in a PMSM, the nature of air gap flux density distribution and the induced excitation voltages in the stator phase windings, produced by the permanent magnet material employed, exhibit sinusoidal waveforms [3]. In this paper, a model is developed for such a PMSM, when its armature is fed by a three phase two-level transistorized voltage source inverter (VSI), self-synchronized with the rotor position information and operating under 180º conduction of the inverter switches. Here, the PMSM three phase armature is fed from a three phase voltage source bridge inverter (operating under 180° conduction) consisting of six self-controlled switches viz. IGBT's with antiparallel diodes. The inverter devices are switched in synchronism with the rotor position information. The rotor position information is assumed available to the inverter by placing, on the rotor, a gray-coded disc. Additionally a set of three infrared emitting diodes (IRED) and a corresponding set of three receptor photodiodes are placed on a stationary frame. The position sensor system, thus formed, is assumed to finally yield three digital electrical pulses, which can be considered as a three bit binary word which goes on changing after each 60°, as the rotor rotates. Thus, the rotor position information after every 60º can be identified. Simple decoder logic uses this information to yield the switching signals of the six self-controlled inverter devices as per the 180° conduction logic [5]. The inverter is conceived to be powered from the DC side from a controllable DC voltage source V_{dc}, which may be varied to achieve speed control in an open-loop manner, in the same way as armature voltage control, done in a conventional DC machine with mechanical commutator.

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Design and Development of Closed Loop Model of an Adjustable Speed Permanent Magnet Synchronous Motor Drive Using PI Controller

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Abstract-This paper deals with the development of closed loop model of an adjustable speed Permanent Magnet Synchronous Motor (PMSM) drive fed from a voltage source inverter operating under 180º conduction mode, self synchronized with the rotor position information is represented. An automated closed loop adjustable speed PMSM drive can be achieved by employing a speed controller, to which the information about the reference speed and actual speed should be available. The incorporation of Sinusoidal Pulse Width Modulation (SPWM) strategy establishes near sinusoidal armature phase currents and comparatively less torque ripples without sacrificing torque/weight ratio. In this closed loop model of PMSM drive, the information about reference speed is provided to a speed controller, to ensure that actual drive speed tracks the reference speed with ideally zero steady state speed error. Design of the speed controller and current controller will be incorporated in order to achieve the desired performance of the closed loop model of PMSM drive accordingly. Therefore classical PI controller is chosen for such a closed loop adjustable speed PMSM drive for the performance optimization.

Keywords- Closed Loop Model, PMSM drive, PI controller, Voltage Source Inverter (VSI),

I. INTRODUCTION

The Permanent Magnet Synchronous Motor (PMSM) is a rotating electrical machine where the stator is a classic three phase stator like that of an induction motor and the rotor has surface mounted permanent magnets. In this regard, The Permanent Magnet Synchronous Motor is equivalent to an induction motor where the air gap magnetic field is produced by a permanent magnet [1]. Thus with the development of permanent materials and control technology the PMSM is mostly used due to high torque/inertia ratio, high power density, high efficiency, reliability and easy for maintenance in different industrial applications. The schematic block diagram of closed loop model of adjustable speed PMSM drive has been represented in Fig.1. This model basically involves development of model of PMSM i.e. for machines having sinusoidal air gap flux distribution. The PMSM, therefore, has a sinusoidal induced emf and requires sinusoidal currents to produce constant torque. The rotor position information is very crucial for field oriented control. For widespread industrial applications, such as high performance motor drives, accurate motor speed control is required in which regardless of sudden load changes and parameter variations [2-3]. Hence, the control system must be designed very carefully as it required to ensure the optimum speed operation under the environmental variations, load variations and structural perturbations. In this paper, the model of a complete closed loop adjustable speed Permanent Magnet Synchronous Motor drive is developed using conventional Proportional Integral (PI) controller, where a three phase two-level voltage source inverter (VSI) feeds the PMSM armature and the VSI is switched according to a sinusoidal pulse width modulation (SPWM) strategy.

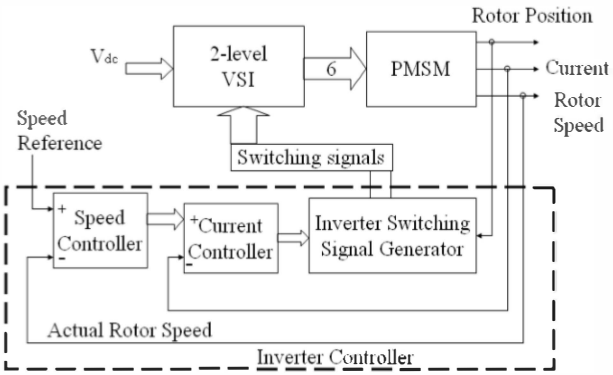

Fig. 1: Schematic block diagram of closed loop model of adjustable speed PMSM drive

II. SYSTEM DESCRIPTION

The complete set-up of the developed model has been represented in Fig 2, The system comprising of four (05) necessary components like SPWM based Voltage Source Inverter (VSI), PMSM motor, position sensor, controller (Speed and current) and the mechanical block. Here an absolute position encoder is mounted on the rotor, which is assumed capable of providing the rotor position information at each instant of time. The inverter is assumed powered from the DC side by a constant DC voltage source, V_{dc} which is not varied. The controller realization starts with the adjustable speed reference, at which the drive is intended to run, irrespective of the load torque variation within a feasible range [4-5]. The information of this reference speed is provided to a speed controller, which is a PI controller in this model in order to track the reference speed [6]. The speed controller output forms the torque or current reference, which is fed to next controller which is the current controller. The current controller output is fed to the block responsible for the generation of the switching signals of the six power

The Comparative Study between Different Performance Indices of a Permanent Magnet Synchronous Motor Drive on Variable Sensor Angle

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Abstract- In this paper the development of a model for self-controlled Permanent Magnet Synchronous Motor drive (PMSM) fed from a three phase voltage source bridge inverter which operates under self-control mode with the rotor position information is presented. The rotor position is monitored online via an absolute position encoder and this information is passed on to the inverter controller block for generating switching signals. It is found that with some settings of the position sensor, near-sinusoidal armature phase currents result, which therefore give rise to less torque ripple. The different performance indices of the system like electrical speed, electromagnetic torque, phase voltage, phase current and rotor position are modelled and subsequently simulated for different sensor angle with varying load. Results obtained through such process are compared and analyzed for optimization of sensor angle.

Keywords- Permanent Magnet Synchronous Motor (PMSM) Drive, Rotor Position, Sensor angle, Voltage Source Inverter (VSI), 180^0 conduction mode.

I. INTRODUCTION

Permanent Magnet Synchronous Machine (PMSM) is a rotating electrical machine with a balanced three phase armature in its stator and a permanent magnet material in its rotor. Due to the absence of any slip ring-brush arrangement, the maintenance problem does not exist and the ruggedness also increases [1]. Generally, in a PMSM, the nature of air gap flux density distribution and the induced excitation voltages in the stator phase windings produced by the permanent magnet material employed, exhibit sinusoidal waveforms. In this paper, a model is developed for PMSM, when its armature is fed by a three phase two-level transistorized voltage source inverter (VSI), self-synchronized with the rotor position information and operating under 180° conduction of the inverter switches. Permanent Magnet Synchronous motors are increasingly used in variable speed industrial drives [2, 3]. New developments and applications have been greatly accelerated by improvements in permanent magnet materials, especially rare earth magnets. In open loop manner the speed control of such a machine can be done in a way similar to that of a conventional dc

machine-by changing the equivalent conceptual" brush" position by varying the sensor position with respect to the rotor frame, characterized by the variable 'sang' in the model [4].

II. THE SYSTEM DESCRIPTION

Fig. 1 shows the drive system for which the proposed model is developed.

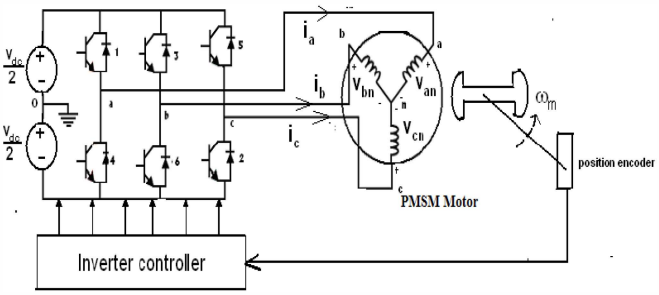

Fig.1: The PMSM drive operating with the inverter operating under 180° conduction

Here, the PMSM three phase armature is fed from a three phase voltage source bridge inverter (operating under 180° conduction) consisting of six self-controlled switches viz. IGBT's with anti parallel diodes. The inverter devices are switched in synchronism with the rotor position information. The rotor position information is assumed available to the inverter by placing, on the rotor, a gray-coded disc. Additionally a set of three infrared emitting diodes (IRED) and a corresponding set of three receptor photodiodes are placed on a stationary frame. The position sensor system, thus formed, is assumed to finally yield three digital electrical pulses, which can be considered as a three bit binary word which goes on changing after each 60°, as the rotor rotates. Thus, the rotor position information after every 60° can be identified [5, 6]. Simple decoder logic uses this information to yield the switching signals of the six self-controlled inverter devices as per the 180° conduction logic. The inverter is conceived to be powered from the DC side from a controllable DC voltage source, V_{dc}, which may be varied to achieve speed control in an open-loop manner, in the same way as armature voltage control, done in a conventional DC machine with mechanical commutator.

III. THE SENSOR POSITION

The concept of the sensor position is all about positioning the gray-coded disc on the rotor and positioning the IREDs with the receptor photodiodes on a stationary frame. Once set, the instant of switching on of a particular armature phase through an inverter device can be synchronized with

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FREQUENCY DEVIATION CONTROL OF A THERMAL AND HYDRO AREA CONNECTED SYSTEM

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Keywords: Bacterial foraging optimization technique, PID Controller, Thermal power plants, Hydro power plant, Controller.

Abstract

Maintaining system frequency within the acceptable tolerance is always a crucial aspect of multi-area power systems. This paper presents a load frequency control (LFC) design of a thermal and hydro connected power system. Performance of a Proportional-Integral-Derivative (PID) controller is investigated in the proposed LFC. Bacterial Foraging algorithm is used for optimization of controller parameters. MATLAB based simulation shows that the controller maintains frequency deviation within the acceptable limit under load variations.

1 Introduction

An interconnected power system consists of several areas in which constant frequency and constant tie-line power exchange make the system to run in stable condition. In each area the system frequency and tie-line flows are monitored by Automatic Generation Control (AGC). This also calculates the net change in the generation required (known as Area Control Error: ACE) as per the change in demand and the set position of the generators is adjusted within the area to keep the time average of the frequency and tie-line power deviations at a low value. The AGC makes ACE to zero so, both frequency and tie-line power errors will be forced to zeros. AGC function can be viewed as a supervisory control function which attempts to match the generation trend within an area to the trend of the randomly changing load of the area, so as to keep the system frequency and the tie-line power flow close to scheduled value [13]. Now a days the demand of electrical energy is increasing day by day but the availability of only fossil fuel is very much limited. So it is required to make a connected grid with both renewable and non renewable energy sources to get bulk amount of power as well as compensate the deficiency of power under shut down condition of any area. Due to problems related to uncertainty in pricing and supply of fossil fuels, renewable resources have been identified as a suitable alternative. An interconnected power system has to generate, transport and distribute electric energy maintaining a constant frequency and terminal voltage under normal as well as under a small perturbation. So Automatic generation and control has become an interesting area of research recently. Different controllers have been developed to maintain the load frequency constant. Frequency deviation is not desirable to us specially for the AC motors. The speed is related to the frequency for them. Also the generator turbines are designed to operate at a very precise speed. Microcontrollers are dependent on frequency for their timely operation. Thus it is imperative to maintain system frequency constant. There are many LFC methods developed for controlling frequency. They include flat frequency control (FFC), tie-line bias control (TBC) and flat tie-line control (FTC). In FFC, Some areas act as load change absorbers and others as base load. The advantage is the higher operating efficiencies of the base load as they run at their maximum rated value at all times. But the drawback here is the reduced number of areas absorbing load changes which makes the system more transient prone. The most commonly used method is the tie-line load bias control in which all power systems in the interconnection aid in regulating frequency regardless of where the frequency change originates. In this paper we have used PID controller and use an optimization technique to set the values of the gains of the controller in such a way so the frequency can be maintained constant.

2 Modelling of Thermal Area

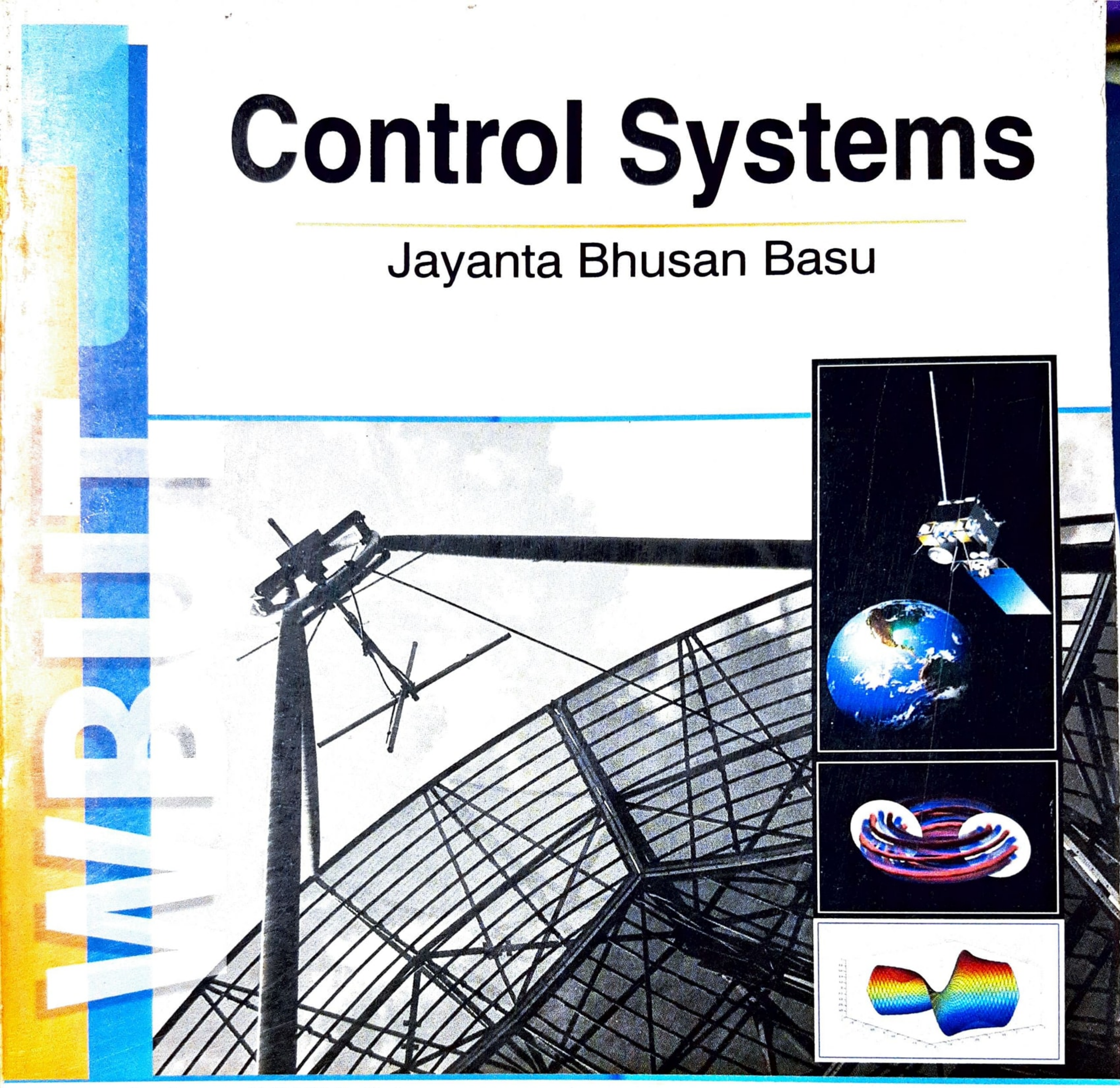
We have modelled the thermal area using the transfer functions of the corresponding equations of them. This area consists of speed governing system, model of turbines, generator and load. Here we have taken a variable load to show that the frequency deviation of the entire area will be zero.

3 Steam Turbine and Governing System

A steam turbine converts stored energy of high pressure and temperature into rotating energy, which in turn converted into

Control Systems

Jayanta Bhusan Basu



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fly"- this quotation of Kalam Sir inspires me to recharge my patience and tolerance level whenever I feel down due to organizational or inter-personal problems that arise due to different situations. This quote helps me to bring myself back from the adverse situations and to overcome the problems that come my way.

- "A creative person is motivated by his or her own desire to excel and not the need to beat others" - according to me this quotation of Kalam Sir is an answer of all doubts where people suffer from losing their intellectual property rights their innovation or creation. It's so true in every sphere of life where general people enjoy the innovation of technical advancements, but do we really care for the intelligence first applied by the innovator or who conceptualized to make those gadgets ? So, we must be motivated to excel in doing the best to satisfy our own goal and to achieve self delight.

- "Do not wait for something big to happen. Start with whatever you have now" ... this quote of Kalam Sir is very much applicable for the start-up project conceivers. Often, new entrepreneurs start their dream of corporate life with impractical thinking which prove beyond their achievable limit at the opening stage of their career. I usually encourage the students to understand this quotation and learn it by heart, so that they do not suffer from inferiority complex in case of being partially successful in their career at the beginning. I do believe that all students have the potential to be successful in their life, but if the frustration engulf their confidence level at the very first step , then it becomes impossible for them to survive with precise spirit.

- "There is no greatness without simplicity, righteousness and truth"... Often we feel dejected as some people become successful in their profession by adopting unfair means. But Kalam Sir rightly pointed out the requirement of simplicity in our lifestyle and that the adoption of the route of righteousness and truth do not have any alternative, because they help us to achieve the mental peace at every stage of our life.

- "Without your involvement you can't succeed. With your involvement you can't fail" - in our professional life many a times we feel like keeping ourselves aloof from the situations although fully being aware of the fact that it is beneficial for the organization or society as a whole. This type of shallow attachment with the organization does not help the organization to grow further. But whole-hearted involvement of the members of the organization can help the organization to be a benchmark in the industry, which is often termed as "quality circle" in the lessons of Total Quality Management.