

JNMES

- > About
- > Aims and Scope
- > Editorial Board
- > Instructions for Authors
- > Article Processing Charge
- > Publication Ethics
- > Submission
- > Current Issue
- > Archive
- > Citation List

Load Frequency Control in Renewable Energy Penetrated Hybrid Power Systems

Indrajit Koley* | Asim Datta | Goutam Kumar Panda
Corresponding Author Email: indrajit.koley@gmail.com



DOWNLOAD PDF

OPEN ACCESS

Page: 268-276 DOI: https://doi.org/10.14447/jnmes.v26i4.a05
Received: 18 August 2022 Revised: 29 June 2023 Accepted: 7 July 2023 Available online: 15 November 2023 Citation
© 2023 IIETA. This article is published by IIETA and is licensed under the CC BY 4.0 license (<http://creativecommons.org/licenses/by/4.0/>).

Abstract:

In order to ensure zero steady-state error in multi-area hybrid power systems, load frequency control is implemented in the power system. However, variations in load due to cyclic amplitude deviation create frequency fault leading to unscheduled tie-line power. Hence a novel Operational Load Forecasting Approach is utilized in which objective function in support vector regression predicts load demand and generation based on temporal characteristics and utilize parallel processing to tolerate the acceptable error margin. Moreover, the uncertainties of active power generation in islanding mode make the estimation of frequency response deviation under decentralized islanding modes difficult. Hence a novel Differential Controller Algorithm has been proposed in which the sigmoidal range function determines the optimal amplitude value from individual areas and the controller predicts the high load demand area that exceeds the threshold limit and isolates that area until the deviation is rectified. Low tie-line power, frequency, and settling time deviations were accomplished using the proposed methodologies as they were simulated using the Simulink platform.

Keywords:

load frequency control, renewable energy source, differential controller, objective function, support vector regression, sigmoidal range function

1 Introduction

Username

Password

Remember me

LOGIN

Journal Content

All Search

Browse

- By Issue
- By Title
- By Author
- Other Journals

Information

- For Readers
- For Authors

Access through another institution

Siliguri Institute of Technology does not subscribe to this content on ScienceDirect.

- Article preview
- Abstract
- Introduction
- Section snippets
- References (43)
- Cited by (1)



Physica D: Nonlinear Phenomena

Volume 436, August 2022, 133324



Controlling birhythmicity in a new Dual Loop Optoelectronic Oscillator with an injection locked van der Pol oscillator

Dia Ghosh^a, Arindum Mukherjee^b, Shantanu Mandal^c, Nikhil Ranjan Das^d, B.N. Biswas^e

Show more

+ Add to Mendeley Share Cite

<https://doi.org/10.1016/j.physd.2022.133324>

Get rights and content

Highlights

- Birhythmicity is coexistence of two different limit cycle oscillations depending upon different initial conditions.
- In the present work we analyse a modified Dual Loop OEO.
- Using weakly nonlinear analysis the amplitude and phase equation of the oscillator is derived.
- Due to the interplay between two delays and the overall nonlinearity

Recommended articles

Performance-improved microwave photonic single-passband filter using birefringence ...

Optics Communications, Volume 428, 2018, pp. 41-46
Enming Xu, ..., Peili Li

Enhancing the security of electro-optic delayed chaotic system with intermittent...

Optics Communications, Volume 352, 2015, pp. 77-83
Xiaojing Gao, ..., Hanping Hu

A tunable dual-passband microwave photonic filter based on optical slicing an...

Optics Communications, Volume 346, 2015, pp. 10-14
Zuowei Xu, ..., Dan Zhang

Show 3 more articles

Article Metrics

Citations	
Citation Indexes:	1
Captures	
Readers:	1

FEEDBACK

Unaccustomed Earth: The Saga of Alienation and Broken Myths and the Emergence of a New Immigrant Culture.

Rimni Chakravarty
Asst professor, Humanities
Department of Engineering Sciences and Humanities
Siliguri Institute of Technology

Abstract

Literature ,since time immemorial has always portrayed life in its varied aspects presenting the culture of the time .By culture it can be understood the values,beliefs,ideas,thoughts,emotions of the particular society where the author pens down in a picturesque manner . Culture is reflected in everything: language, literature, visual arts, verbal and non-verbal attitude of the people of the society. Cultures may differ in conducts, food habits, dressing style, way of expression, courtesies, management of time and. The manner of presenting the self based on thoughts and beliefs. The present paper emphasizes on the novel *Unaccustomed Earth* the second short story collection by critically acclaimed Bengali-American author Jhumpa Lahiri. Published in 2008 about the struggle of the Indians settled in America with the American culture as also their own tradition which they try hard to cast aside yet their own customs, surface when confronted with different situations. This collection of short stories paints the life in the Indian American Diaspora. The author pictures the struggle of the two generations of the Indian Immigrants who have settled in America where most of the protagonists belong to the second generation trying to adjust themselves in the American culture yet totally could not negate the Indian tradition of hospitality. The article finds out how the different characters struggle adopting the culture of the land they have settled in and projecting their own Indian culture which they have inherited by birth. The article projects how complexities arise in relationships where the characters feign to be contented in their adopted life style. The article also finds how restless the characters are and as they are torn and tossed between the east and west which they struggle hard to identify and find

Organization Development Journal ISSN: 0889-6402

Realizing Spirituality in Every Moment of Life

Rimni Chakravarty
Asst .Professor
Humanities
Siliguri Institute of Technology

Abstract

Spirituality as the dictionary states is “the quality of being concerned with the human spirit or soul as opposed to material or physical things” .The term spirituality has become very much vogue in every sector of life .In fact spirituality has become a subject of discussion in every seminar, conference with some purpose to solve the problems persisting in our society and lead life that help every human being to prosper with mental satisfaction. The aim of this article is to discuss what is the meaning of spirituality and how it was practiced through ages in our Indian culture and the ways individuals can practice to connect the self with the others known or unknown to feel united and attain bliss for developing a world where one can connect oneself with the other in a harmonious manner .It would be a world where through spiritual practice there would be a feeling of one ness or the “we attitude” that benefit the society at large. It is also an attempt to find out how various issues can be solved by being spiritual in everyday situation. It is also an attempt to discuss how the path of spirituality guide students as well as the professionals to utilize their energy for developing positive attitude and building conducive environment for smooth ,flawless communication and also solve physical and mental disturbances by being treading on to the path of spirituality. The study concludes with the recommendation that spiritual education need to be mandatory in every school college and even important for parents to follow so they become the role models who pass on the legacy to their next generation for a world of peace and harmony

Key words: spirituality, culture, legacy, peace, harmony

Organization Development Journal ISSN: 0889-6402

The Night of the Scorpion: The Tale of the Juxtaposition of the Indian Reality.

Hrishikesh Roy
Assistant Professor,
Department of Engineering Sciences and Humanities,
Siliguri Institute of Technology, Sukna, Siliguri 734009

Rimni Chakravarty
Assistant Professor,
Department of Engineering Sciences and Humanities,
Siliguri Institute of Technology, Sukna, Siliguri- 734009

Abstract:
The Night of the Scorpion written by Nissim Ezekiel who won Sahitya Academy award for portraying Indian life has become a subject of study in the school and university curriculum for its theme and depiction of Indian style of life. The aim of the article is to find out the reasons for its enormous appeal even in this age of advanced science and technology where the reader can connect the poem in real life. The article aims to study the dichotomy of Indian living standards where superstition and rationality reigns, ignorance and education run parallel in Indian system of living. The paper proposes to find out how the contrary poles move together even as our astronauts and scientists move to Mars or land in the Moon. The paper draws a conclusion how religion and science can co exists together in our life and blood. It has also been recommended to appreciate Indian English poetry in the syllabus of all the universities as Indian English Poetry aims to represent life and its varied nature. At the same this article tries to justify that in this universe two opposite poles runs parallel and still the universe exists with all its variegated aspects . The Night of the Scorpion too represents a picture where the same story can be found.

Key words: Indian, Rationality, Science, Ignorance, Parallel

WhatsApp

RPE 23 MAKAUT
~gayensailenmath401: Ok sir

4 unread messages

Type a reply Send

Empirical Economics Letters, 21 (Special Issue 3): (December 2022) ISSN 1681 8997
<https://doi.org/10.5281/zenodo.7722198>

Learner Satisfaction in Academic Dynamics of Learner-Centric online Learning Method: A Multivariate Approach

Dipak Saha

*Department of Business Administration
Institute of Engineering & Management,
Kolkata, West Bengal, India*

Email: dipak.saha@iemcal.com

Shuvendu Dey

*Department of Business Administration
Siliguri Institute of Technology
Siliguri, West Bengal, India*

Email: shuvendudey@gmail.com

Nandan Sengupta

*Anglia Ruskin University
Cambridge Campus, United Kingdom*

Email: nandansengupta@gmail.com

Abstract: The physical based classroom education is starting to lose its concentration as the nest of learning. This paper is an attempt to investigate how online learner-centric method helps in developing sustainable education ecosystem. Based on the survey of 685 learners in the eastern part of India, the degree of learners' involvement has been found to be very significant in online learner-centric learning education system. The research has shown how the online learner-centric education system has created a path breaking example for offering learner-centric learning environment. Results indicate that majority of the students are satisfied from the education received in online Learning mode which shows online learning has a lot of potential in augmenting higher education in a country like India where dimensions of higher education process is limited. The authors have also addressed the vital issue of implications of the findings and suggested direction for further research.

Keywords: Learner-Centric Learning, Cognitive Ability, Online Edu-eco System, Customer Satisfaction

1. Introduction

Predictive framework for crime data analysis using a hybrid logistic regression — support vector machine based ensemble classifier powered by CART (LR-SVM^{CART})



Multimedia Tools and Applications

[Aims and scope](#) →

[Submit manuscript](#) →

Published: 17 March 2023

Volume 22, pages 35357–35377, (2023) [Cite this article](#)

[Anupam Mukherjee & Anupam Ghosh](#) ✉

271 Accesses 2 Citations 1 Altmetric [Explore all metrics](#) →

Abstract

Significant rise in illegal activity has directly impacted socioeconomic growth and quality of life. In this article, a predictive crime data analysis framework has been proposed that can resolve the problem of scalability issues and accuracy rate. This paper proposed a hybrid ensemble machine learning classifier to identify authentic crime activities. A series of experiments are used to verify the efficiency of our proposed algorithms. Three datasets of different countries are used for this experiment purpose. All the datasets are tested successfully on our proposed framework and novel ensembles classifier. The result produced by our proposed hybrid ensemble classifier mostly outperforms the performance of most of the existing machine learning approaches. This work aims to identify geospatial crime data intensity where we can anticipate the recurrence of a certain crime in the city using geospatial technology, allowing the police force to take the required precautions to

Access this article

[Log in via an institution](#) →

[Buy article PDF 39,95 €](#)

Price includes VAT (India)
Instant access to the full article PDF.

Rent this article via [DeepDyve](#) ↗

[Institutional subscriptions](#) →

Sections

Figures

References

[Abstract](#)

[References](#)



Search for Articles: Search Advanced

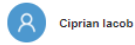
Journals / Polymers / Volume 14 / Issue 5 / 10.3390/polym14050956



- Submit to this Journal
- Review for this Journal
- Propose a Special Issue

Article Menu

Academic Editor



Subscribe SciFeed

Recommended Articles

Related Info Links

More by Authors Links

Article Views 1872

Citations 4

Table of Contents

- Abstract
- Introduction
- Materials and Methods
- Results

K

Order Article Reprints

Open Access Article

Static Permittivity and Electro-Optical Properties of Bi-Component Orthoconic Antiferroelectric Liquid Crystalline Mixtures Targeted for Polymer Stabilized Sensing Systems

by Shantiram Nepal¹, Banani Das^{1*}, Malay Kumar Das², Madhumita Das Sarkar³, Magdalena Urbańska⁴ and Michał Czerwiński^{4*}

- Department of Physics, Siliguri Institute of Technology, Siliguri 734009, India
 - Department of Physics, University of North Bengal, Siliguri 734013, India
 - Department of Microelectronics and VLSI Technology, Maulana Abul Kalam Azad University of Technology, WB, Kolkata 741249, India
 - Faculty of Advanced Technologies and Chemistry, Military University of Technology, 00-908 Warsaw, Poland
- * Authors to whom correspondence should be addressed.

Polymers **2022**, *14*(5), 956; <https://doi.org/10.3390/polym14050956>

Submission received: 1 February 2022 / Revised: 24 February 2022 / Accepted: 24 February 2022 / Published: 27 February 2022

(This article belongs to the Special Issue Polymer-Based Sensors)

- Download
- Browse Figures
- Versions Notes

Abstract

The behavior of two newly formulated bi-component orthoconic antiferroelectric liquid crystalline (OAFLC) systems, i.e., the Compound A + Compound B mixture system and Compound C + Compound B mixture system has been discussed in light of temperature and concentration dependencies of helical pitch length, spontaneous polarization, relaxation time, bulk viscosity, and the anchoring energy strength coefficient, together with static dielectric permittivity (ϵ) and dielectric anisotropy. Compound A + Compound B mixtures possess spontaneous polarization between 190–340 nC.cm⁻² and fast relaxation times between 190–320 μ s in the smectic antiferroelectric SmC_A^{*} phase at room temperature. Compound C + Compound B mixtures also have a spontaneous polarization in the range of 190–280 nC.cm⁻² and relaxation times in the range of 190–230 μ s at room temperature. Most of the mixtures have a helical pitch below one micrometer in the SmC_A^{*} phase. These advanced mixtures show a broad temperature range of the antiferroelectric SmC_A^{*} phase, fast switching of molecules under an applied electric field, negative dielectric anisotropy and a short helical pitch, confirming the advantage of designing new polymer-stabilized OAFLC that is targeted for novel application in sensing devices, utilizing the fast responsive electro-optical modulation elements.

- Share
- Help
- Cite
- Discuss in SciProfiles
- Endorse
- Comment

87 Views
1 CrossRef citations to date
0 Altmetric

Research Article

Critical behaviour near the nematic-smectic-C and nematic-smectic-A phase transitions of a binary system: a comparative study from calorimetric, optical and dielectric measurements

Smriti Mitra, Malay Kumar Das & Banani Das
Pages 1725-1743 | Received 26 Dec 2022, Accepted 13 Apr 2023, Published online: 26 Apr 2023

Cite this article | https://doi.org/10.1080/02678292.2023.2203702 | Check for updates

Full Article | Figures & data | References | Citations | Metrics | Reprints & Permissions | Read this article

Sample our Physical Sciences Journals
>> Sign in here to start your access to the latest two volumes for 14 days

ABSTRACT

Detailed heat capacity, birefringence and dielectric anisotropy measurements have been carried out near the nematic - smectic-C (NC) and the nematic - smectic-A (NA) phase transitions of a mesogenic binary system. Important feature is the existence of two tricritical points one for the NC transition and other for the NA transition. The dependence of critical exponent (α) is well explained in terms of temperature ratios (T_{NC}/T_{NI} and T_{NA}/T_{NI}) for the NC and NA phase transitions. Both transitions exhibit non-universal behaviour and showing effective critical exponents in between tricritical and 3D-XY values. However, the nematic range necessary for the NC tricritical point is quite large ($>20^{\circ}\text{C}$). The enthalpy, phase shift and imaginary heat capacity are also analogous to the nature of the critical exponent (α). Moreover, within a very small concentration range, the smectic-A - smectic-C (AC) transition line appears. Although the smectic-A width above the AC transition is quite small~2K, heat capacity and birefringence data clearly confirm second-order nature. Additionally, there exists a region where the NC, NA and AC line segments converge, i.e. a NAC multicritical point. At this point, the latent heat for the NC, NA and AC transition lines disappears, indicating an obvious second-order nature of the NAC multicritical point.

N-SmC

N-SmA

Related Research

- People also read**
 - Recommended articles**
 - Cited by 1**
- Investigation on the critical behaviour in the vicinity of the smectic-A to re-entrant nematic-phase transition >
- Barnali Barman et al.
Liquid Crystals
Published online: 7 Nov 2023
- Flexible liquid crystal micro-lens arrays for curved integral imaging 2D/3D convertible display >
- Wen-Wen Wang et al.
Liquid Crystals
Published online: 24 Apr 2023
- Enhancement of electro-optical properties and phase transition temperature of thermotropic liquid crystal 5CB by doping with 4-n-pentylbenzoic acid >

Access through Siliguri Institute of Tec... Purchase PDF Access through another institution

- Article preview
- Abstract
- Introduction
- Section snippets
- References (64)
- Cited by (11)



Energy Volume 268, 1 April 2023, 126682

Influence of areca nut husk nano-additive on combustion, performance, and emission characteristics of compression ignition engine fuelled with plastic-grocery-bag derived oil-water-diesel emulsion

Dipankar Saha, Bidesh Roy

Show more Add to Mendeley Share Cite

https://doi.org/10.1016/j.energy.2023.126682 Get rights and content

Highlights

- ANH nano-additives (40nm) were prepared for CI engine application.
- ANH was dosed (in 5, 10, and 15ppm) in PO-water-diesel emulsion.
- BSFC reduced by a maximum of 9.1%.
- 17.9, 14.7, and 17.6% reduction of CO, HC and smoke with D10EPO-15ppm.

Abstract

Recommended articles

Investigation on influencing mechanisms of phosphogypsum (PG) on the ash fusion...

Energy, Volume 268, 2023, Article 126699 Fenghai Li, ..., Yitian Fang

Spray collapse resistance of GDI injectors with different hole structures under flash...

Energy, Volume 268, 2023, Article 126689 Mengzhao Chang, ..., Suhan Park

Combustion mechanism and product characteristics of 2,3,3,3-tetrafluoroprope...

Energy, Volume 268, 2023, Article 126695 Yubo Chen, ..., Teng Fei

Show 3 more articles

Article Metrics

Citations	
Citation Indexes:	10
Captures	
Readers:	18

PLUMX View details

- Article preview
- Abstract
- Introduction
- Section snippets
- References (48)
- Cited by (2)



Sustainable Energy Technologies and Assessments
Volume 57, June 2023, 103266



Experimental investigation of thermal performance, kinetic triplets, and synergistic effect for bamboo-waste plastic (PP & PE) blends using thermogravimetric analyser in N₂ atmosphere

Satyajit Pattanayak^{a,b}, Chanchal Laha^a, Rohit Kumar Singh^c, Dipankar Saha^d

Show more
+ Add to Mendeley Share Cite

<https://doi.org/10.1016/j.seta.2023.103266> Get rights and content

Highlights

- Study the co-pyrolysis of North-East Indian bamboo and waste plastic using TGA.
- The extent of synergistic effect is investigated for the blend samples.
- Friedman, QFW, and KAS methods are used for the determination of kinetic triplets.
- Synergistic behavior and activation energy analysis identify the optimum blend for co-pyrolysis.
- Blend samples of 75% bamboo with 25% PP / PE show optimum results.

Recommended articles

- Investigation on turning process performance during machining of 15-5PH...**
Materials Today: Proceedings, 2023
P. Sivaiah, ..., M. Dilip Kumar
- Numerical simulation of turbulent natural convection heat transfer in an MW-class...**
Sustainable Energy Technologies and Assessments, Vo...
Zhenhuan Zhang, ..., Yuan Yuan
- Techno-economic analysis of incorporating up to 20% of wetland for the installation o...**
Sustainable Energy Technologies and Assessments, Vo...
Shehzadi Bushra Javeed, ..., Shaheryar A. Khan

Article Metrics

Citations	
Citation Indexes:	2
Captures	
Readers:	11
Social Media	
Shares, Likes & Comments:	27
View details >	

FEEDBACK

Filomat 37:6 (2023), 1713–1721
<https://doi.org/10.2298/FIL2306713B>



Published by Faculty of Sciences and Mathematics,
University of Niš, Serbia
Available at: <http://www.pmf.ni.ac.rs/filomat>

On the set of all I -convergent sequences over different spaces

Mandobi Banerjee^a, Manasi Mandal^b

^aDepartment of Engineering Sciences and Humanities (Mathematics), Siliguri Institute of Technology, Hill Cart road, Sukna, Siliguri, Darjeeling-734009, West Bengal, India

^bDepartment of Mathematics, Jadavpur University, Kolkata-700032, West Bengal, India

Abstract. In this article we elaborately study certain characteristics of the set of all I -convergent sequences over various topological spaces. Earlier results of different authors were concerned regarding the closeness property of the sets: set of all bounded statistically convergent sequences, set of all bounded statistically convergent sequences of order α , set of all bounded I -convergent sequences over the space ℓ^∞ (ℓ^∞ - endowed with the sup-norm) only. On this context apart from this observation other properties (like connected and dense) of all three above mentioned sets have not yet been discussed over any other spaces. Our approach is to examine different behaviors of the set of all I -convergent sequences over different spaces. Finally we are able to exhibit a condition over sequence spaces for which the set of all I -convergent sequences form a closed set.

1. Introduction

In the year 1951, a subject was commenced as a generalization of usual convergence which is known as statistical convergence. Interestingly Fast [8] and Steinhaus [19] (see also [17]) explored the same conception independently in their own way. So many years later in 1980 and 1985 authors Šalát [15] and Fridy [9]

KRAGUJEVAC JOURNAL OF MATHEMATICS
VOLUME 46(2) (2022), PAGES 229–239.

$\alpha\beta$ -WEIGHTED d_g -STATISTICAL CONVERGENCE IN PROBABILITY

MANDOBI BANERJEE

ABSTRACT. In this paper we consider the notion of generalized density, namely, the natural density of weight g was introduced by Balcerzak et al. (Acta Math. Hungar. **147**(1) (2015) 97–115) and the entire investigation is performed in the setting of probability space extending the recent results of Ghosal (Appl. Math. Comput. **249** (2014) 502–509) and Das et al. (Filomat **31**(5) (2017) 1463–1473).

1. INTRODUCTION

In the year 1932, Agnew [1] defined the *deferred Cesàro mean* of sequences of real numbers such as



Search

Login / Register

JOURNALS ABOUT / GET PUBLISHED EVENTS COLLECTIONS



Advertisement: 2025 Ryoji Noyori ACES Award. Submit your nomination by 31 March 2024. Includes a photo of a man.

ChemistrySelect

Volume 8, Issue 2
January 16, 2023
e202203780

Polyethylene Glycol (PEG-200): An Efficient, Green and Biocompatible Reaction Medium for the Metal-Free Synthesis of Functionalized 1,4-Benzothiazines.

Aminul Islam, Rabindranath Singha, Pranab Ghosh

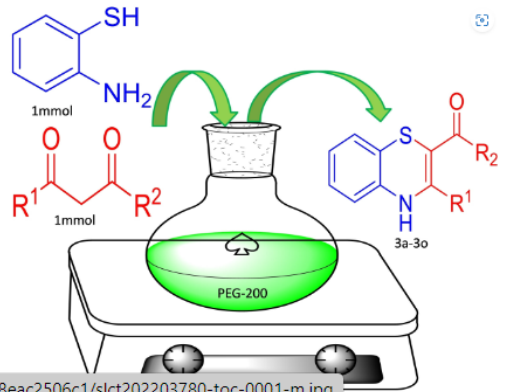
First published: 13 January 2023 | <https://doi.org/10.1002/slct.202203780>

Read the full text > PDF TOOLS SHARE

Advertisement: ChemPhotoChem Call for Papers. Special Issue: Semiconductor-Based Photocatalysts for Solar Fuel Generation. Submission Deadline: 31 May 2024.

Graphical Abstract

In this research work, we synthesized functionalized 1,4-benzothiazine derivatives, a principal group of heterocyclic compounds, which reported to possess wide applications in medicinal chemistry. We used Polyethylene glycol (PEG-200) as a new class of green and biocompatible reaction medium for the metal free synthesis of this biologically active heterocycle.



References Related Information

- Recommended**
[Polyethylene glycol \(PEG-400\) Mediated One-pot Green Synthesis of 4,7-Dihydro-2H-pyrazolo\[3,4-b\]pyridines Under Catalyst-free Conditions](#)
Nagaraju Kerru, Lalitha Gummidi, Suresh Maddala, Sreekantha B. Jonnalagadda
ChemistrySelect
- [Polyethylene Glycol as a Green Medium for the Microwave-Assisted Synthesis of Guanamines](#)
Han Yin Lim, Anton V. Dolzhenko
ChemistrySelect
- [Influence of Polyethylene Glycol Unit on Palladium- and Nickel-Catalyzed Ethylene Polymerization and Copolymerization](#)
Dan Zhang, Changliu Chen



Search for Articles:

Search input fields: Title / Keyword, Author / Affiliation / Email, Energies, All Article Types, Search, Advanced

Journals / Energies / Volume 16 / Issue 4 / 10.3390/en16041621



- Submit to this Journal
Review for this Journal
Propose a Special Issue

Article Menu

- Academic Editors: Chuanbo Xu, Jianli Zhou, Shenbo Yang
Subscribe SciFeed
Recommended Articles
Related Info Link
More by Authors Links

Article Views: 745
Citations: 1

K

Order Article Reprints

Open Access Article

System Economy Improvement and Risk Shortening by Fuel Cell-UPFC Placement in a Wind-Combined System

by Mital Ranjan Chakraborty 1, Subhojit Dawn 2,* Pradip Kumar Saha 3, Jayanta Bhushan Basu 1 and Taha Selim Ustun 4,*

- 1 Department of Electrical Engineering, Siliguri Institute of Technology, Siliguri 734009, West Bengal, India
2 Department of Electrical & Electronics Engineering, Velagapudi Ramakrishna Siddhartha Engineering College, Vijayawada 520007, Andhra Pradesh, India
3 Department of Electrical Engineering, Jalpaiguri Government Engineering College, Jalpaiguri 735102, West Bengal, India
4 Fukushima Renewable Energy Institute, AIST (FREA), Koriyama 963-0298, Japan
* Authors to whom correspondence should be addressed.

Energies 2023, 16(4), 1621; https://doi.org/10.3390/en16041621

Submission received: 17 January 2023 / Revised: 2 February 2023 / Accepted: 4 February 2023 / Published: 6 February 2023

(This article belongs to the Special Issue Wind/PV/Hydrogen Integrated Energy System for a Clean Future)

Download, Browse Figures, Versions Notes

Abstract

It is important to understand the features of an integrated renewable energy power system, especially for deregulated systems. The greatest obstacle to assimilating renewable energy generators with the existing electrical system is their unpredictability. Because wind energy is inconsistent, incorporating it into an established power system necessitates more planning. The effects of wind farm (WF) incorporation with fuel cells and a unified power flow controller (UPFC) on electric losses, voltage profile, generating price, and the economics of the system in a deregulated power market are examined in this paper. An impact analysis of integrating wind farms into controlled and uncontrolled situations is conducted. At two randomly selected locations in India, the real-time statistics of the actual wind speed (AWS) and forecasted wind speed (FWS) were merged for this study. The surplus charge rate and deficit charge rate are intended to evaluate the imbalance cost which is arising from the difference between anticipated and true wind speeds to determine the economics of the system. Customers are always trying to find electricity that is reliable, inexpensive, and efficient due to the reconfiguration of the power system. As a consequence, the security limitations of the system may be surpassed or might function beyond the safety limit, which is undesirable. In the last section, heuristic algorithms, such as sequential quadratic programming (SQP),

- Share
Help
Cite
Discuss in SciProfiles
Endorse
Comment

Journals & Magazines > IEEE Access > Volume: 11

Risk Mitigation & Profit Improvement of a Wind-Fuel Cell Hybrid System With TCSC Placement

Publisher: IEEE | Cite This | PDF

Jayanta Bhusan Basu; Subhojit Dawn; Pradip Kumar Saha; Mitul Ranjan Chakraborty; Faisal Alsaifi; Sager Alsulamy; Taha Selim Ustun... All Authors

2 Cites in Papers | 383 Full Text Views

Open Access | Comment(s) | Under a Creative Commons License

Abstract

Document Sections

- I. Introduction
- II. Mathematical Formulation
- III. Objective Function
- IV. Proposed Methodology
- V. Results and Discussion

Show Full Outline

- Authors
- Figures
- References
- Citations
- Keywords
- Metrics

Abstract:

The incorporation of renewable energy into the existing electrical system is vital in a competitive electrical system. The unpredictable nature of renewable sources is the main obstacle to energy source integration. Since wind energy is unpredictable, integrating it into an existing thermal system requires some additional operating procedures to maintain the economic and functioning sustainability of the system. In a competitive power network, renewable energy uncertainty creates an imbalance cost (IC) which directly affects the system economy. This study investigates system generation costs, voltage profiles, and electric losses in a deregulated power market incorporating wind farms (WF) & fuel cells (FC). The fuel cell has been used here as a reserve generating unit to mitigate the deficit of power in the renewable incorporated system. To check the efficacy of the presented method, two locations in India are chosen at random. To assess the imbalance cost caused by the discrepancy between forecasted (FWS) and actual wind speeds (AWS), several charge rates (i.e. surplus and deficit) were established. The electrical system has been restructured, so consumers are continually looking for efficient and stable economic power which is only possible by reducing the system risk. This paper outlines a strategy for the optimal operation of a Thyristor-Controlled Series Compensator (TCSC) and fuel cell in a wind-integrated system to maximize system profit and minimize the system risk. In this work, different algorithms like Sequential Quadratic Programming (SQP), Artificial Bee Colony Algorithms (ABC), and Moth Flame Optimization Algorithms (MFO) are used to analyze the economic and functional risk of the system. Additionally, it explains how the fuel cell system is employed to offset the wind farm integration's deviation in the real-time power market. Value-at-Risk (VaR) and conditional Value-at-Risk (cVaR) have been used for risk analysis. A modified IEEE 14-bus test system ...

(Show More)



Need Full-Text
access to IEEE Xplore for your organization?
[CONTACT IEEE TO SUBSCRIBE >](#)

More Like This

Particle Swarm Optimization Approach for Cost Minimization of Hybrid Renewable Energy Sources
2022 7th International Conference on Environment Friendly Energies and Applications (EFEA)
Published: 2022

Optimal Power Dispatch for Power Systems Under High Penetration of Renewable Energy Sources
IEEE EUROCON 2021 - 19th International Conference on Smart Technologies
Published: 2021

[Show More](#)

The IEEE Open Journal of Antennas and Propagation has received its first Journal Impact Factor™
Now accepted for indexing by Clarivate

Feedback

© August 2022| IJIRT | Volume 9 Issue 3 | ISSN: 2349-6002

Review and Approximate Analysis of Edge Detection Algorithms using MATLAB

Anindita Sinha¹, Dr. Surajit Mandal²

¹Assistant Professor, Dept of ECE, Siliguri Institute of Technology

²Associate professor, Dept. of ECE, B. P. Poddar Institute of Management and Technology

Abstract - The primary objective of image processing system is to understand the content of image efficiently and tracks the significant and important information from it. The first step in an image processing system is the edge sensibility in a digital image [1]. Edge detection is one of the most important parts of image processing. The fundamental feature of an image is its edges, and it can be formed from the outlines or boundaries of the object. An edge is used to mark or identify the outer lines or borders and make a division of plane and from other plane appearance of an object. There are different types of algorithms available for detecting the edges. In this paper, the comprehensive study is done on the several edge detection techniques such as Prewitt, Sobel, Canny, Roberts and Laplacian of Gaussian (LoG).

Index Terms - Edge sensibility, Edge detection, Prewitt, Sobel, Canny, Roberts and Laplacian of Gaussian.

INTRODUCTION

Digital image processing has become a practical as well as accepted research area that goes from

information, so only significant structures are maintained. Edge detection uses an approach where the intensity point varies. It is a series of actions used to identify the points in an image where clear and defined changes occur in intensity [1]. But it is very complicated to perform edge detection operation in a noisy image because noise and image both of them having high frequency component.

EDGE DETECTION TECHNIQUE


Edge detection uses differential operators to detect changes in the gradients of the grey levels. It is divided into two main categories:

- a. Gradient Based Technique
- b. Laplacian Based Technique

Again, Gradient based technique is divided into Sobel, Prewitt and Robert Operator whereas Laplacian based technique is divided into Laplacian of Gaussian (LoG) and Canny operator.

- a. Gradient Based Technique: In gradient based

Formation of $\text{Li}_{10}\text{Zn}_4\text{O}_9$, Li_2MoO_3 , and ZnSeO_3 Nanophases: Roles in Electrical Conductivity and Electrochemical Stability in Lithium Ion Conductors and their Crystalline Counterparts

Aditi Sengupta¹, Anil Chamuah², Rakesh Ram², Chandan Kumar Ghosh³, Sanghraj Diyal⁴, Bhaskar Biswas⁴, Mir Sahidul Ali⁵ and Sanjib Bhattacharya² 

Published 28 November 2022 • © 2022 The Electrochemical Society ("ECS"). Published on behalf of ECS by IOP Publishing Limited

[ECS Journal of Solid State Science and Technology, Volume 11, Number 11](#)

Citation Aditi Sengupta *et al* 2022 *ECS J. Solid State Sci. Technol.* 11 113008

DOI 10.1149/2162-8777/aca2dd

+ Article and author information

Abstract

Li_2O doped glass-nanocomposites and their crystalline counterparts have been developed and analyzed on the light of DC conductivity and cyclic-voltammetric (CV) studies. Micro-structural study reveals the distribution of $\text{Li}_{10}\text{Zn}_4\text{O}_9$, $\text{Li}_2\text{Zn}_2(\text{MoO}_4)_3$, ZnMoO_4 , $\text{Zn}(\text{MoO}_4)_2$, $\text{Li}_2\text{Mo}_6\text{O}_7$ and Li_2MoO_3 nanophases in the glassy matrices. Crystalline counterparts exhibit an enhancement in crystallites' sizes. As the crystalline counterpart is formed by controlled cooling, ZnSeO_3 chain structure is expected to break by increasing dimensions of molybdate rod-like structures. In the present study, crystalline counterpart shows better electrochemical stability. Interconnected ZnSeO_3 nanophases have to initiate structural stability as they play pivotal role in the formation of structure. Formation of $\text{Li}_{10}\text{Zn}_4\text{O}_9$ and Li_2MoO_3 nanophases are supposed to be responsible for higher conductivity in the glassy system.

Article metrics

59 Total downloads



MathJax

[Turn on MathJax](#)

Permissions

[Get permission to re-use this article](#)

Share this article



Abstract

You may also like

JOURNAL ARTICLES

[A Fundamental Stability Study for Amorphous \$\text{LiLaTiO}_3\$ Solid Electrolyte](#)

[\$\text{Li}_2\text{O}\$ - \$\text{ZnO}\$ - \$\text{MoO}_3\$ - \$\text{SeO}_2\$ glass-nanocomposites and their crystalline counterparts:](#)

[microstructure, electrical transport mechanism and first principle DFT analysis](#)

[X-ray absorption spectroscopy of \$\text{GeO}_2\$ glass to 64 GPa](#)

[Amorphous silicene—a view from molecular dynamics simulation](#)

[Amorphous \$\text{RuS}_2\$ electrocatalyst with optimized active sites for hydrogen evolution](#)

[Amorphous-crystalline transition in thermoelectric \$\text{NbO}_2\$](#)

physicsworld | jobs

[Tenure-track Faculty Positions in Experimental and Theoretical Physics](#)
The Hong Kong University of



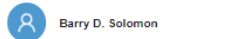
Search for Articles: Title / Keyword Author / Affiliation / Email Sustainability All Article Types Search Advanced

Journals / Sustainability / Volume 14 / Issue 13 / 10.3390/su14138069

sustainability logo, Submit to this Journal, Review for this Journal, Propose a Special Issue

Article Menu

Academic Editor Barry D. Solomon



Subscribe SciFeed

Recommended Articles

Related Info Link

More by Authors Links

Article Views 1297

Citations 17

Table of Contents

- Abstract Introduction System Modeling Optimization Techniques

K Order Article Reprints

Open Access Article

A Strategy for System Risk Mitigation Using FACTS Devices in a Wind Incorporated Competitive Power System

by Arup Das 1, Subhojit Dawn 2, Sadhan Gope 1 and Taha Selim Ustun 3

- 1 Department of Electrical Engineering, Mizoram University, Aizawl 796004, India
2 Department of Electrical & Electronics Engineering, Velagapudi Ramakrishna Siddhartha, Engineering College, Vijayawada 520007, India
3 Fukushima Renewable Energy Institute, AIST (FREI), Koriyama 963-0298, Japan

Sustainability 2022, 14(13), 8069; https://doi.org/10.3390/su14138069

Submission received: 9 May 2022 / Revised: 13 June 2022 / Accepted: 25 June 2022 / Published: 1 July 2022

(This article belongs to the Topic Distributed Generation and Storage in Power Systems)

Download Browse Figures Versions Notes

Abstract

Electricity demand is sharply increasing with the growing population of human beings. Due to financial, social, and political barriers, there are lots of difficulties when building new thermal power plants and transmission lines. To solve this problem, renewable energy sources and flexible AC transmission systems (FACTS) can operate together in a power network. Renewable energy sources can provide additional power to the grid, whereas FACTS devices can increase the thermal limit of existing transmission lines. It is always desirable for an electrical network to operate under stable and secure conditions. The system runs at risk if any abnormality occurs in the generation, transmission, or distribution sections. This paper outlines a strategy for reducing system risks via the optimal operation of wind farms and FACTS devices. Here, a thyristor-controlled series compensator (TCSC) and a unified power flow controller (UPFC) have both been considered for differing the thermal limit of transmission lines. The impact of the wind farm, as well as the combined effect of the wind farm and FACTS devices on system economy, were investigated in this work. Both regulated and deregulated environments have been chosen to verify the proposed approach. Value at risk (VaR) and cumulative value at risk (CVaR) calculations were used to evaluate the system risk. The work was performed on modified IEEE 14 bus and modified IEEE 30-bus systems. A comparative study was carried out using different optimization techniques, i.e., Artificial Gorilla Troops Optimizer Algorithm (AGTO), Honey Badger Algorithm (HBA), and Sequential Quadratic Programming (SQP) to check the effect of renewable integration in the regulated and deregulated power systems in terms of system risk and operating cost.

Share Help Cite Discuss in SciProfiles Endorse Comment

Home / Archives / Engineering Review, Vol. 42, No. 2 / Articles

Load frequency control scheme for a microgrid system with the application of hTLO-DE algorithm

Indrajit Koley
Department of Electrical Engineering, Siliguri Institute of Technology, Siliguri 734009, India

Dr. Asim Datta
Department of Electrical Engineering, Tezpur University, Tezpur, Assam 784028, India

Dr. Goutam Kumar Panda
Department of Electrical Engineering, Jalpaiguri Government Engineering College, Jalpaiguri 735102, India

Abstract

Load frequency control (LFC) is a critical feature of electrical power systems for maintaining a balance between power supply and load demand and avoiding system frequency deviation. The present work aims to implement an effective LFC scheme for a microgrid system comprising of diesel generator (DEG), wind turbine generator (WTG), and battery storage. Proportional-integral-double-derivative (PIDD) controllers are used to implement the LFC scheme. The controller parameters are computed using a hybrid teaching-learning-optimization differential-evaluation (hTLO-DE) algorithm. The results obtained using PIDD controllers are compared with that found with the traditional PI and PID controllers. A critical analysis exposes that the PIDD controller can give a

PDF

Published
2022-12-17

Issue
[Engineering Review, Vol. 42, No. 2](#)

Section
Articles

License
[Engineering review uses the Creative Commons Attribution-NonCommercial-NoDerivatives \(CC-BY-NC-ND\) 4.0 International License](#), which governs the use, publishing and distribution of articles by authors, publishers and the wider general public.

Information

- [For Readers](#)
- [For Authors](#)
- [For Librarians](#)

Open Journal Systems

[Make a Submission](#)

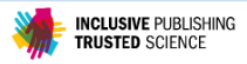
Browse

Announcements

Online First edition of Engineering Review Vol. 43 No. 1

March 17, 2023
The Online First edition of Engineering Review Vol. 43 No. 1 is open. It can be accessed at: <https://hrcaj.srce.hr/broj/22827>

Physica Scripta



PAPER

Li₂O-ZnO-MoO₃-SeO₂ glass-nanocomposites and their crystalline counterparts: microstructure, electrical transport mechanism and first principle DFT analysis

Aditi Sengupta¹, Prolay Halder², Mir Sahidul Ali³, Chandan Kumar Ghosh⁴ and Sanjib Bhattacharya^{5,2}

Published 29 June 2022 • © 2022 IOP Publishing Ltd

[Physica Scripta](#), Volume 97, Number 8

Citation Aditi Sengupta *et al* 2022 *Phys. Scr.* 97 085804

DOI 10.1088/1402-4896/ac7ae9

[References](#) [Open science](#)

[+ Article and author information](#)

Abstract

Li₂O doped glass-nanocomposites and their crystalline counterparts have been developed. Micro-structural study reveals the distribution of Li₂Zn₂(MoO₄)₃, ZnMoO₄, Zn(MoO₄)₂, Li₂Mo₆O₇ and Li₂MoO₃ nanorods in the glass-nanocomposites. Crystalline counterparts of them exhibit enhancement in sizes of nanophases. DFT and Density of States (DOS) spectra may be considered here to confirm the conducting nature of these nanophases. The ionic conductivity is found to be a function of frequency as well as temperature. In the small value of frequency, flat-conductivity may arise owing to the diffusional motion of Li⁺ ions whereas the 'higher frequency dispersion' may cause the nature of the motion of lithium ions with a tendency of sub-diffusive random trapping. As the crystalline counterpart is formed by controlled heating, ZnSeO₃ chain-structure is expected to break by increasing the length and breadth of molybdate rod-like structures, which may lead to the formation of more voids (defects), where Li⁺ ions are supposed to be trapped. 10%–13% of the net Li⁺ ions are contributing to electrical transport processes.

This site uses cookies. By continuing to use this site you agree to our use of cookies. To find out more, see our [Privacy and Cookies](#) policy.

Article metrics
132 Total downloads



Submit
[Submit to this Journal](#)

MathJax
[Turn on MathJax](#)

Permissions
[Get permission to re-use this article](#)

Share this article
[Email](#) [Facebook](#) [Twitter](#) [LinkedIn](#)

[Abstract](#)

[References](#)

You may also like

JOURNAL ARTICLES

[The Origin and Acceleration of ³He and Heavy Ions in the 2000 July 14 Event](#)

[Photoluminescence Characteristics of Bi³⁺-Doped Silica Optical Fiber: Structural Model and Theoretical Analysis](#)

[Red-Ox Reactions in Ionic Liquids and Their Impact on Electrodeposition of Metals and Alloys](#)

[Reflecting on Čerenkov reflections](#)

[SRP Workshop on Exemption and Clearance Levels](#)

[Formation of Li₁₀Zn₄O₉, Li₂MoO₃, and ZnSeO₃ Nanophases: Roles in Electrical Conductivity and Electrochemical Stability in Lithium Ion Conductors and their Crystalline Counterparts](#)

physicsworld | jobs

[Career Opportunities with M16 Secret Intelligence Service M16](#)

[High Voltage Pulsed Power Engineer](#)



Search for Articles: Title / Keyword, Author / Affiliation / Email, Batteries, All Article Types, Search, Advanced

Journals / Batteries / Volume 8 / Issue 9 / 10.3390/batteries8090124

Submit to this Journal, Review for this Journal, Propose a Special Issue

Article Menu

- Academic Editors: Luis Hernández-Callejo, Jesús Armando Aguilar Jiménez, Carlos Meza Benavides

- Subscribe SciFeed, Recommended Articles, Related Info Link, More by Authors Links

Article Views: 7903, Citations: 25

Table of Contents

Order Article Reprints

Open Access, Review

A Comparative Review on Energy Storage Systems and Their Application in Deregulated Systems

by Mital Ranjan Chakraborty 1, Subhojit Dawn 2,* Pradip Kumar Saha 3, Jayanta Bhushan Basu 1 and Taha Selim Ustun 4,*

- 1 Department of Electrical Engineering, Siliguri Institute of Technology, Siliguri 734009, West Bengal, India
2 Department of Electrical & Electronics Engineering, Velagapudi Ramakrishna Siddhartha Engineering College, Vijayawada 520007, Andhra Pradesh, India
3 Department of Electrical Engineering, Jalpaiguri Government Engineering College, Jalpaiguri 735102, West Bengal, India
4 Fukushima Renewable Energy Institute, AIST (FREI), Koriyama 963-0298, Japan
* Authors to whom correspondence should be addressed.

Batteries 2022, 8(9), 124; https://doi.org/10.3390/batteries8090124
Submission received: 10 August 2022 / Revised: 28 August 2022 / Accepted: 7 September 2022 / Published: 10 September 2022

(This article belongs to the Topic Advances in Renewable Energy and Energy Storage)

Download, Browse Figures, Versions Notes

Abstract

Electrical energy is critical to the advancement of both social and economic growth. Because of its importance, the electricity industry has historically been controlled and operated by governmental entities. The power market is being deregulated, and it has been modified throughout time. Both regulated and deregulated electricity markets have benefits and pitfalls in terms of energy costs, efficiency, and environmental repercussions. In regulated markets, policy-based strategies are often used to deal with the costs of fossil fuel resources and increase the feasibility of renewable energy sources. Renewables may be incorporated into deregulated markets by a mix of regulatory and market-based approaches, as described in this paper, to increase the systems economic stability. As the demand for energy has increased substantially in recent decades, particularly in developing nations, the quantity of greenhouse gas emissions has increased fast, as have fuel prices, which are the primary motivators for programmers to use renewable energy sources more effectively. Despite its obvious benefits, renewable energy has considerable drawbacks, such as irregularity in generation, because most renewable energy supplies are climate-dependent, demanding complex design, planning, and control optimization approaches. Several optimization solutions have been used in the renewable-integrated deregulated power system. Energy storage technology has risen in relevance

Share, Help, Cite, Discuss in SciProfiles, Endorse, Comment



Search for Articles: Title / Keyword Author / Affiliation / Email Electronics All Article Types Search Advanced

Journals / Electronics / Volume 11 / Issue 18 / 10.3390/electronics11182857



- Submit to this Journal
Review for this Journal
Propose a Special Issue

Article Menu

Academic Editor



- Subscribe SciFeed
Recommended Articles
Related Info Link
More by Authors Links

Article Views 1958

Citations 11

Table of Contents

- Abstract
Introduction
Status of Renewable Energy Integration
Status of Flexible AC Transmission System

Order Article Reprints

Open Access Review

A Comparative Study on System Profit Maximization of a Renewable Combined Deregulated Power System

by Jayanta Bhusan Basu, Subhojit Dawn, Pradip Kumar Saha, Mitul Ranjan Chakraborty, and Taha Selim Ustun

- 1 Department of Electrical Engineering, Siliguri Institute of Technology, Darjeeling 734009, West Bengal, India
2 Department of Electrical & Electronics Engineering, Velagapudi Ramakrishna Siddhartha Engineering College, Vijayawada 520007, Andhra Pradesh, India
3 Department of Electrical Engineering, Jalpaiguri Government Engineering College, Vijayawada 735102, West Bengal, India
4 Fukushima Renewable Energy Institute, AIST (FREA), Koriyama 963-0298, Japan
* Authors to whom correspondence should be addressed.

Electronics 2022, 11(18), 2857; https://doi.org/10.3390/electronics11182857

Submission received: 10 August 2022 / Revised: 5 September 2022 / Accepted: 7 September 2022 / Published: 9 September 2022

(This article belongs to the Special Issue Feature Papers in Power Electronics)

- Download
Browse Figures
Versions Notes

Abstract

Electrical energy plays a key role in the development of the social as well as the economic front. The power sector has historically been owned and operated by state agencies due to its tremendous importance. It has been restructured over time, and the power market is being deregulated. In terms of consumer prices, efficiency, and environmental implications, both regulated and deregulated electricity markets offer advantages and disadvantages. Policy-based techniques are typically used in regulated markets to address the costs of fossil-fuel resources and boost the viability of renewable energy sources. Renewables can be integrated into deregulated markets through a combination of regulatory and market-based measures to extend the system's economic stability which has been deployed in this paper. As the need for energy has expanded dramatically over the last few decades, particularly in developing countries, the amount of greenhouse gas emissions has climbed rapidly, as have fuel prices, which are the key driving forces behind initiatives to use renewable energy sources more effectively. Despite the apparent benefits of renewable energy, it has significant downsides, such as generation of optimization methods applied to renewable consistency, because most renewable energy supplies are climate-dependent, necessitating complicated design, planning, and control optimization methods. There have been numerous optimization strategies applied to

- Share
Help
Cite
Discuss in SciProfiles
Endorse
Comment



- Submit to this Journal
- Review for this Journal
- Propose a Special Issue

Article Menu

Academic Editor

Peng-Yeng Yin

Subscribe SciFeed

Recommended Articles

Related Info Link

More by Authors Links

Article Views 1045

Citations 4

Table of Contents

- Abstract
- Introduction
- Mathematical Modeling
- Objective Function
- Proposed Methodology
- Results and Discussion
- Conclusions
- Author Contributions
- Funding
- Conflicts of Interest
- References

IK

Order Article Reprints

Open Access Article

Economic Enhancement of Wind–Thermal–Hydro System Considering Imbalance Cost in Deregulated Power Market

by Jayanta Bhusan Basu ¹, Subhojit Dawn ^{2,*}, Pradip Kumar Saha ³, Mitul Ranjan Chakraborty ¹ and Taha Selim Ustun ^{4,*}

- Department of Electrical Engineering, Siliguri Institute of Technology, Darjeeling 734009, India
 - Department of Electrical & Electronics Engineering, Velagapudi Ramakrishna Siddhartha Engineering College, Vijayawada 520007, India
 - Department of Electrical Engineering, Jalpaiguri Government Engineering College, Jalpaiguri 735102, India
 - Fukushima Renewable Energy Institute, AIST (FREIA), Koriyama 963-0298, Japan
- * Authors to whom correspondence should be addressed.

Sustainability 2022, 14(23), 15604; https://doi.org/10.3390/su142315604

Submission received: 21 October 2022 / Revised: 4 November 2022 / Accepted: 10 November 2022 / Published: 23 November 2022

- Download
- Browse Figures
- Versions Notes

Abstract

Studying the property of the combination of renewable energy sources in the existing power systems is of great importance, and especially in the case of deregulated systems. The uncertainty of renewable sources is the largest barrier to integrating renewable-energy-producing units into the existing electrical infrastructure. Due to its uncertainty, integrating wind power into an existing power system requires extra consideration. In this work, the impacts of wind farm (WF) integration and a pumped hydroelectric storage system (PHES) on the electric losses, voltage profiles, generation costs, and system economy in a deregulated power market were studied. A comparative study was performed to determine the impact of wind farm integration on regulated and deregulated environments. Four locations in India were chosen at random for this work, and we used the real-time statistics for the actual wind speeds (AWSs) and forecasted wind speeds (FWSs) for each chosen location. To determine the system economy, surplus charge rates and deficit charge rates were developed to evaluate the imbalance cost resulting from the mismatch between the predicted and actual wind speeds. Considering the effect of the imbalance cost, the system profit/day varies by an average of 1.6% for the locations studied. Because of the reorganization of the power system, consumers constantly look for reliable and affordable power that is also efficient. As a result, the system security limit may be breached, or the system may run in a dangerous state. Lastly, in this paper, an economic risk analysis is presented with the help of heuristic algorithms (i.e., artificial bee colony algorithm (ABC) and moth–flame optimization algorithm (MFO)), along with sequential quadratic programming (SQP), and the way in which the PHES is used to compensate for the deviation in the WF integration in the real-time electricity market is also presented. The value at risk (VaR) and conditional value at risk (CVaR) were used as the economic risk analysis tools. According to the work, with the increase in the wind generation, the system risk improves. The results show that, as the wind generation increases by three times, there is an improvement in the risk coefficient values by 1%. A modified IEEE 14-bus test system was used for the validation of the entire work.

Keywords: regulated system; deregulated system; wind energy; energy storage devices; modern power

- Share
- Help
- Cite
- Discuss in SciProfiles
- Endorse
- Comment



- Submit to this Journal
- Review for this Journal
- Propose a Special Issue

Article Menu

Academic Editor

Surrender Reddy Salkuti

Subscribe SciFeed

Recommended Articles

Related Info Link

More by Authors Links

Article Views 1067

Table of Contents

- Abstract
- Introduction
- Mathematical Modeling
- Objective Function
- Proposed Method
- Application of the Suggested Approach
- Conclusions
- Author Contributions
- Funding
- Institutional Review Board Statement
- Informed Consent Statement
- Data Availability Statement
- Conflicts of Interest
- Abbreviations and Notations

IK

Order Article Reprints

Open Access Article

System Profit Improvement of a Thermal–Wind–CAES Hybrid System Considering Imbalance Cost in the Electricity Market

by Mitul Ranjan Chakraborty ^{1,*}, Subhojit Dawn ^{2,*}, Pradip Kumar Saha ³, Jayanta Bhusan Basu ¹ and Taha Selim Ustun ^{4,*}

- Department of Electrical Engineering, Siliguri Institute of Technology, Darjeeling 734009, West Bengal, India
 - Department of Electrical & Electronics Engineering, Velagapudi Ramakrishna Siddhartha Engineering College, Vijayawada 520007, Andhra Pradesh, India
 - Department of Electrical Engineering, Jalpaiguri Government Engineering College, Jalpaiguri 735102, West Bengal, India
 - Fukushima Renewable Energy Institute, AIST (FREIA), Koriyama 963-0298, Japan
- * Authors to whom correspondence should be addressed.

Energies 2022, 15(24), 9457; https://doi.org/10.3390/en15249457

Submission received: 21 October 2022 / Revised: 25 November 2022 / Accepted: 8 December 2022 / Published: 13 December 2022

(This article belongs to the Special Issue Recent Advances in Renewable Energy)

- Download
- Browse Figures
- Versions Notes

Abstract

Studying a renewable energy integrated power system's features is essential, especially for deregulated systems. The unpredictability of renewable sources is the main barrier to integrating renewable energy-producing units with the current electrical grid. Due to its unpredictable nature, integrating wind power into an existing power system requires significant consideration. In a deregulated electricity market, this paper examines the implications of wind farm (WF) integration with CAES on electric losses, voltage profile, generation costs, and system economics. Comparative research was done to determine the impact of wind farm integration on regulated and deregulated environments. Four randomly chosen locations in India were chosen for this investigation, together with real-time information on each location's real wind speed (RWS) and predicted wind speed (PWS). Surplus charge rates and deficit charge rates were created to assess the imbalance cost arising from the discrepancy between predicted and real wind speeds to calculate the system economics. When the effect of imbalance cost is considered, the daily system profit shows a variation of about 1.9% for the locations under study. Customers are always seeking electricity that is dependable, affordable, and efficient due to the reorganization of the power system. As a result, the system security limit could be exceeded or the system might function dangerously. The final section of this paper presents an economic risk analysis using heuristic algorithms such as sequential quadratic programming (SQP), artificial bee colony algorithms (ABC), and moth flame optimization algorithms (MFO). It also discusses how the CAES is used to correct the deviation of WF integration in the real-time electricity market. Economic risk analysis tools include value-at-risk (VaR) and conditional value-at-risk (CVaR). The entire piece of work was validated using a modified IEEE 30-bus test system. This work shows that with a three-fold increase in wind generation, the risk coefficient values improves by 1%.

Keywords: regulated system; deregulated system; wind energy; compressed air energy storage; system

- Share
- Help
- Cite
- Discuss in SciProfiles
- Endorse
- Comment

Abstract: Quantum dot cellular automata (QCA) provide rapid computational efficiency, high density and low power consumption, which is an alternative for CMOS technology. In digital world, cryptography is an important feature to protect digital data. To ensure the data protection in nano-communication, a QCA-based cryptographic architecture is proposed in this article. In the proposed design, the encryption and decryption is done with the help of random keys which is produced by the pseudo random number generator (PRNG). In this paper, architectural component of cryptographic architecture includes XOR block, 1 to 4 de-multiplexer and PRNG, which are realised using QCA. Finally, an integration of the individual components through clock zone-based crossover, lead to the generation of a novel cryptographic architecture. This design achieves low cost compared to the existing literature, as it uses minimum number of majority gate and inverters with clock zone-based crossover.

Keywords: quantum dot cellular automata; QCA; clock zone-based crossover; CZBC; cryptographic architecture; pseudo random number generator; PRNG; demultiplexer; nano-router.

DOI: 10.1504/IJICT.2022.10051962

- **Diabetic retinopathy detection using curvelet and retina analyser** 

by Manas Saha, Biswa Nath Chatterji

Abstract: The diabetic retinopathy (DR) is a clinical disorder of retina caused due to diabetes mellitus. This work presents an automated detection of DR images using curvelet and retina analyser. Like Fourier transform, curvelet is a mathematical transform. It is deployed here to trace the directional field of the curve singularities of the retina images. This helps to segment the retinal vasculature of the fundus images. The change in retinal morphology like length, diameter, tortuosity due to the ophthalmoscopic changes are computed by retina analyser. Feedforward neural network (FNN) is implemented to detect DR images with sensitivity: 79%, specificity: 94% and accuracy: 88% which is better than the contemporary works. The proposed system is a smart integration of three modules - curvelet, retina analyser and FNN. It is simple, less time consuming and easily implementable. In future the same system can be extended to detect exact stage of DR.

Keywords: diabetic retinopathy; retinal vasculature; tortuosity; optic fundus; single layer perceptron.

DOI: 10.1504/IJICT.2022.10052060

- **Study on enterprise financial information management system based on big data analysis.**


by Li Zhang