

3.3.1

Research Publications During Assessment Period: 2018-19 to 2022-23



SRI SIVANI COLLEGE OF ENGINEERING

(Under the Management of Sri Sivani Educational Society, Srikakulam)
(Approved by AICTE, New Delhi and Affiliated to JNTUGV, Vizianagaram-CC-W6
UGC Recognition under 2(f) & 12(B), ISO 9001:2015 Certified)
NH-16, Chilakapalem Jn., Srikakulam Dist. Andhra Pradesh -532410
. Andhra Pradesh -532410



SRI SIVANI COLLEGE OF ENGINEERING

(Under the Management of Sri Sivani Educational Society, Srikakulam)

Approved by AICTE, New Delhi and Affiliated to JNTUGV, Vizianagaram (CC:W6)
Recognised by UGC U/S 2 (f) & 12 (B)

ISO 9001 : 2015
CERTIFIED CAMPUS

NH-16, Chilakapalem (Jn), Etcherla (M), Srikakulam - 532 410, A.P., Tel : : 08942 231106, 73826 51411

List of Research Publications During Assessment Period 2018-19 to 2022-23

S.No.	Title of the Paper	Name of the Authors	Name of the Journal
1	Synergistic removal of 1-(4-hydroxy-3-methoxyphenyl) ethenone (Apocynin) with enhanced immobilized and suspended Sr-doped LaNiO ₃ based photo-catalytic membrane reactor under gamma irradiation	Yenda. Srinivasa Rao	Global NEST Journal
2	Investigation of copper ion adsorption using sawdust powder: isotherm, kinetic and thermodynamic studies	Yenda. Srinivasa Rao	Global NEST Journal
3	Biosynthesis of Iron Oxide Nanoparticles Using Leaf Extract of Ruellia tuberosa: Mechanical and Dynamic Mechanical Behaviour Kevlar-Based Hybrid Epoxy Composites	Yenda. Srinivasa Rao	Bioinorganic Chemistry and Applications
4	Biosynthesis-Based Al ₂ O ₃ Nanofiller from Cymbopogon citratus Leaf/Jute/Hemp/Epoxy-Based Hybrid Composites with Superior Mechanical Properties	Yenda. Srinivasa Rao	Bioinorganic Chemistry and Applications
5	Two-degree-of-freedom tilt integral derivative controller-based firefly optimisation for automatic generation control of restructured power system	Tulasichandra Sekhar Gorripotu	International Journal of Computer Applications in Technology
6	Frequency regulation of hybrid power system using firefly algorithm	Tulasichandra Sekhar Gorripotu	International Journal of Innovative Computing and Applications
7	Computational analysis of a knuckle joint and implementation of the generalized regression neural network	J. Bala Bhaskara Rao	International Journal of Neuroquantology



SRI SIVANI
GROUP OF COLLEGES

SRI SIVANI COLLEGE OF ENGINEERING
SRI SIVANI COLLEGE OF PHARMACY
SRI SIVANI POLYTECHNIC

E-mail : info@srisivani.com, principal_w6@yahoo.co.in,

Website : www.srisivani.com

8	Optimizing the design of a fly wheel using machine learning	J. Bala Bhaskara Rao	International Journal of Neuroquantology
9	Design of a fuzzy logic controller for short-term load forecasting with randomly varying load	Tulasichandra Sekhar Gorripotu	International Journal of Sociotechnology and Knowledge Development (IJSKD)
10	Design and analysis of search group algorithm-based PD-PID controller plus redox flow battery for automatic generation control problem	Tulasichandra Sekhar Gorripotu	International Journal of Computer Applications in Technology
11	Tuning of extended Kalman filter using grey wolf optimisation for speed control of permanent magnet synchronous motor drive	Tulasichandra Sekhar Gorripotu	International Journal of Automation and Control
12	Design and implementation of a nonlinear controller and observer for inverter fed permanent magnet synchronous motor drive using dSPACE DS1103 controller board	Tulasichandra Sekhar Gorripotu	International Journal of Automation and Control
13	Integrated multi-input DC-DC converter with reduced switches	Tulasichandra Sekhar Gorripotu	International Transactions on Electrical Energy Systems
14	A Brief Study on IoT Concepts	D. Priyanka	International Journal of Scientific Research in Engineering and Management (IJSREM)
15	Statistical Analysis of Various Measures in Auditing Practices using Optimization Techniques	D. Priyanka	Science, Technology and Development
16	Evaluation of knuckle joint performance with altered materials by executing a smart prediction tool	J. Bala Bhaskara Rao	International Journal of Advanced Science and Technology
17	Experimental and Numerical Analysis of Fluid Flow in Microfibers	Subrat Kumar Barik	International Journal of Recent Technology and Engineering (IJRTE)
18	Performance Analysis of Grid Synchronization Method for Three-Phase Three-Wire Networks under Grid Fault Conditions	Tulasichandra Sekhar Gorripotu	International Journal of Advanced Science and Technology
19	Evaluation of thermal performance and implementation of prediction tool in a heat exchanger with elliptical leaf strips	J. Bala Bhaskara Rao	Journal of heat and mass transfer
20	Consequential prediction of brain status and diagnosis of epilepsy	G Rajendra Kumar	International Journal of Advanced Science and Technology

21	Consequential prediction of brain status and diagnosis of epilepsy	Madugula Muralikrishna	International Journal of Advanced Science and Technology
22	Consequential prediction of brain status and diagnosis of epilepsy	J. Bala Bhaskara Rao	International Journal of Advanced Science and Technology
23	Intelligent Secure Ecosystem Based on Metaheuristic and Functional Link Neural Network for Edge of Things	Dr. Janmenjoy Nayak	IEEE Transactions on Industrial Informatics
24	Black hole optimised cascade proportional derivative-proportional integral derivative controller for frequency regulation in hybrid distributed power system	Tulasichandra Sekhar Gorripotu	International Journal of Swarm Intelligence
25	Evaluation of a Double Pipe Heat Exchanger by using Double Elliptical Leaf Strips with Opposite Orientation and Same Direction and Executing with a Smart Prediction Tool of GRNN	J. Bala Bhaskara Rao	International Journal of Recent Technology and Engineering
26	Execution of a Modern Prediction Tool for Evaluation of Thermal Performance in a Heat Exchanger by Expending Triple Elliptical Leaf Angle Strips with Altered Orientation and Opposite Direction	J. Bala Bhaskara Rao	International Journal of Recent Technology and Engineering
27	Using a Generalized Regression Neural Network Prediction Tool to Estimate Thermal Performance in A Heat Exchanger By using Triple Elliptical Leaf Angle Strips with Opposite Orientation and Same Direction	J. Bala Bhaskara Rao	International Journal of Innovative Technology and Exploring Engineering
28	Execution of a Smart Prediction Tool to Evaluate Thermal Performance in a heat exchanger by using Single Elliptical Leaf Strips with altered Angle	J. Bala Bhaskara Rao	International Journal of Innovative Technology and Exploring Engineering
29	Implementation of GRNN for Evaluating the Pressure Drop and Heat Transfer in a Heat Exchanger By Utilizing Triple Elliptical Leaf Angle Strips With Same Orientation and Opposite Direction	J. Bala Bhaskara Rao	International Journal of Engineering and Advanced Technology
30	Implementation of A Neural Network Tool For Evaluation Of Thermal Performance In A Heat Exchanger By Using Double	J. Bala Bhaskara Rao	International Journal of Engineering and Advanced Technology

	Elliptical Leaf Angle Strips With Same Orientation And Same Direction		
31	Impact of Flexible AC Transmission System Devices on Automatic Generation Control with a Metaheuristic Based Fuzzy PID Controller	Tulasichandra Sekhar Gorripotu	Energies
32	A framework for crime data analysis using relationship among named entities	Janmenjoy Nayak	Neural Computing and Applications
33	Differential evolution algorithm tuned tilt integral derivative controller with filter controller for automatic generation control	Tulasichandra Sekhar Gorripotu	Evolutionary Intelligence
34	Aspect Based Sentiment Analysis using Naïve Bayes and Support Vector Classifiers	Janmenjoy Nayak	The International journal of analytical and experimental modal analysis
35	Design and analysis of BFOA optimised PID controller with derivative filter for frequency regulation in distributed generation system	Tulasichandra Sekhar Gorripotu	Int. J. Automation and Control
36	Neural network and fuzzy system for the tuning of Gravitational Search Algorithm parameters	Janmenjoy Nayak	Expert Systems with Applications
37	A Novel Honey-Bees Mating Optimization Approach with Higher order Neural Network for Classification	Janmenjoy Nayak	Journal of Classification
38	Experimental Investigations on Wear Behavior of AA2024-Flyash-Nanostructured Redmud Hybrid Composites Synthesized by Stircasting	Murali Krishna. B	International Journal of Surface Engineering and Interdisciplinary Materials Science
39	Feature selection generating directed rough-spanning tree for crime pattern analysis	Janmenjoy Nayak	Neural Computing and Applications
40	Tumble flow studies using flat, flat with bowl, inclined and inclined with bowl pistons for suitability of stratified internal combustion engine	Murali Krishna. B	Academia Journal of Scientific Research


IQAC


PRINCIPAL
PRINCIPAL
SRI SWAMI COLLEGE OF ENGINEERING
Chilakapalem Jn., SRIKAKULAM

Synergistic removal of 1-(4-hydroxy-3-methoxyphenyl) ethenone (Apocynin) with enhanced immobilized and suspended Sr-doped LaNiO₃ based photo-catalytic membrane reactor under gamma irradiation

Ragunath S.¹, Srinivasa Rao Y.², Sujatha S.³, and Gokulan R.^{4*}

¹Department of Civil Engineering, Jansons Institute of Technology, Coimbatore, Tamil Nadu - 641-659, India

²Department of Mechanical Engineering, Sri Sivani College of Engineering, Srikakulam, Andhra Pradesh, India

³Department of Civil Engineering, K. Ramakrishnan College of Technology, Trichy, Tamil Nadu - 621 112, India

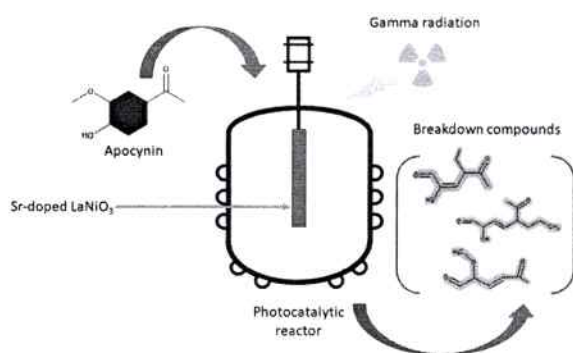
⁴Department of Civil Engineering, GMR Institute of Technology, Rajam, Srikakulam, Andhra Pradesh – 532 127, India

Received: 07/10/2022, Accepted: 07/11/2022, Available online: 09/11/2022

*to whom all correspondence should be addressed: e-mail: gokulan.r@gmrit.edu

<https://doi.org/10.30955/gni.004508>

Graphical abstract



Abstract

The electrolytic approach was combined with radiolysis employing gamma radiation as an enhanced oxidation process to study the decomposition of 1-(4-Hydroxy-3-Methoxyphenyl) ethenone (Apocynin (ACN)). For Apocynin breakdown from effluent water, a photocatalytic membrane reactor (PMR) was utilized with suspended and immobilised Sr-LaNiO₃ with regarding to gamma irradiation. For phase procedures, the impacts of basic Sr-LaNiO₃ on the PMR containing residual Sr-LaNiO₃ was investigated. An RO (Reverse Osmosis) membrane was integrated by way of the PMR under continuous circumstances to improve standard of water. At such a moderate Sr-LaNiO₃ dosage (0.8 g/L), ACN deterioration by the PMR with attached and immobilised Pt-LaNiO₃ was similar in both methods, but improved with larger Sr-LaNiO₃ doses for the reactor with coupled Pt-LaNiO₃.

Keywords: Apocynin, electrochemical degradation, photocatalytic reactor, gamma irradiation

1. Introduction

Several commodity-based industries that manufactures cork, pulp and paper uses a lot of electricity and freshwater, consequently, generates large volumes of sewage water. The generated sewage water contains effective levels of biochemical oxygen demand (BOD) and chemical oxygen demand (COD), intense colour, particulates, and non-biodegradable chemicals (Sevimli, 2005; Madureira *et al.*, 2014). The release of such unprocessed effluents might have a harmful influence on the environment because of the existence of these resistive chemicals, which should be reduced. Apocynin (ACN), a lignin degradation by-product found in pulp, paper and cork effluents. Microfiltration was used to remove apocynin from an aqueous mixture Gallic acid and Esculetin, according to some early research that were published (Acero *et al.*, 2005). The persistence effectiveness of the membrane was shown to be dependent on the nature of the membrane, with poor persistence for ACN in the utilized membranes. Hence, it is essential to eliminate ACN from water prior to release into freshwater resources.

In treating sewage water, there seems to be a number of techniques for decontamination. For eliminating pharmaceutically active substances, reverse osmosis (RO) and nano-filtration (NF) are the effective methods. Furthermore, before even being released into freshwater resources, the re-circulated stream containing high level contaminants must be eliminated (Simon *et al.*, 2009). These chemicals have been successfully removed using advanced oxidation processes (AOPs) such as ultraviolet (UV), semiconductor photo catalysis, Fenton and ozonation (Klavarioti *et al.*, 2009). As a result, AOPs have a great deal of capability for decomposing such compounds in sewage water. LaNiO₃ photo-catalysts has

Ragunath S., Rao Y.S., Sujatha S., and Gokulan R. (2023), Synergistic removal of 1-(4-hydroxy-3-methoxyphenyl) ethenone (Apocynin) with enhanced immobilized and suspended Sr-doped LaNiO₃ based photo-catalytic membrane reactor under gamma irradiation, *Global NEST Journal*, 25(2), 50-56.


 PRINCIPAL
 SRI SIVANI COLLEGE OF ENGINEERING
 Chitlakapalem Jn., SRIKAKULAM

Investigation of copper ion adsorption using activated sawdust powder: Isotherm, kinetic and thermodynamic studies

Ilavarasan N.¹, Srinivasa Rao Y.S.², Gokulan R.^{3*}, and Aravindan A.⁴

¹Department of Civil Engineering, University College of Engineering, Anna University, BIT Campus, Tiruchirappalli, Tamil Nadu, India

²Department of Mechanical Engineering, Sri Sivani College of Engineering, Srikakulam, Andhra Pradesh, India

³Department of Civil Engineering, GMR Institute of Technology, Rajam, Andhra Pradesh – 532 127, India

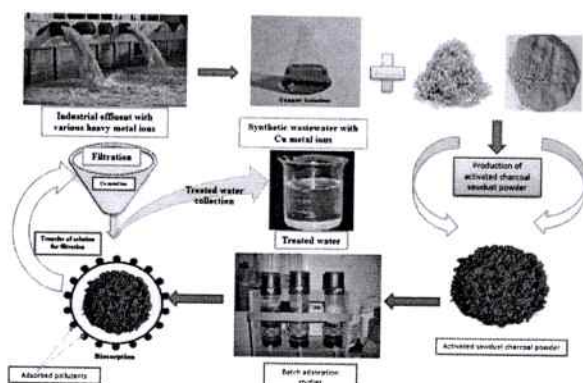
⁴Department of Civil Engineering, Koneru Lakshmaiah Educational Foundation, Guntur, Andhra Pradesh – 522 502, India

Received: 24/09/2022, Accepted: 23/10/2022, Available online: 31/10/2022

*to whom all correspondence should be addressed: e-mail: gokulravi4455@gmail.com

<https://doi.org/10.30955/gnj.004496>

Graphical abstract



Abstract

The batch adsorption technique investigated the efficiency of sawdust adsorbent for removing copper ions from synthetic solutions. A chemical synthesis process prepared the activated sawdust powder, and its surface area and pore volume were obtained by BET isotherm analysis. The ability of copper ion uptake by activated sawdust powder was examined under the characterization study of SEM, EDX & FTIR studies. Various isotherm studies checked the process of adsorption, and the kinetic studies confirm the nature of the adsorption process with sawdust adsorbent. Thermodynamic studies were used to analyze the endothermic nature of the adsorption process, and 0.3 N of H₂SO₄ acid desorbs 93.27% of copper ions from the spent adsorbent. The experimental study confirms the better adsorption ability of sawdust powder in the activated charcoal form to remove the heavy metal pollution in aqueous solutions.

Key words: Biosorption, sawdust powder, copper ions, isotherm & kinetic studies.

1. Introduction





Water pollution is one of the emerging problems we are still facing from earlier days. Clean water is essential to all

living creatures for their survival. Changes in water's physical and chemical characteristics create harmful effects on humans and animals. Due to the rapid growth of industrial activities and a huge amount of product production, the industries used clean water for manufacturing and cleaning purposes (Sasireka *et al.*, 2021). Many pollutants such as dyes, heavy metals, bacterial growth and other non-degradable elements have been presented in the industrial effluent, contaminating the natural water bodies while discharging from the industries. Among these pollutants, heavy metals play an important role in water pollution released from tanneries, electroplating and pulp & paper industries (Halim *et al.*, 2019). Heavy metal ions released from the industries, such as cadmium, copper, chromium, arsenic, lead, etc., accumulate in effluents. These are very harmful to the surroundings and create severe effects even in very low concentrations. Consumption of polluted water may create long-term effects on all living beings and increases the severity of the surrounding environment.

Developing an innovative treatment process at a very low cost has been a basic need in recent days, and many treatment technologies are available to treat the primary pollutants in the water. Chemical precipitation, Membrane filtration, Ion exchange, Adsorption, Coagulation and flocculation are the most common treatment methods available to remove the non-degradable toxic pollutants from wastewater. Among these methods, adsorption has been used widely recently, and no secondary sludge was developed during the treatment process (Batagarawa *et al.*, 2019). Selecting the adsorbate material is one of the important techniques to increase the efficiency of the adsorption rate. Many organic and inorganic materials were used, such as groundnut shells, orange & banana peels, Seeds of various plants, Fly ash and, industrial sewage sludge etc (Yahya *et al.*, 2020). In this research, sawdust powder activated carbon has been used to remove the copper (Cu²⁺) metal ion concentrations from the synthetic solutions using the batch adsorption technique. The maximum allowable limit of copper metal ion is

Research Article

Biosynthesis of Iron Oxide Nanoparticles Using Leaf Extract of *Ruellia tuberosa*: Mechanical and Dynamic Mechanical Behaviour Kevlar-Based Hybrid Epoxy Composites

L. Natrayan ¹, Yenda Srinivasa Rao,² Gayatri Vaidya,³ Sumanta Bhattacharya ⁴,
S. Kaliappan ⁵, Pravin P. Patil,⁶ and Prabhu Paramasivam ⁷

¹Department of Mechanical Engineering, Saveetha School of Engineering, SIMATS, Chennai 602105, Tamil Nadu, India

²Department of Mechanical Engineering, Sri Sivani College of Engineering, Srikakulam, Andhra Pradesh, India

³Department of Studies in Food Technology, Davangere University, Davangere, Karnataka, India

⁴Department of Textile Technology, Maulana Abul Kalam Azad University of Technology (MAKAUT), Westbengal, Kolkata, India

⁵Department of Mechanical Engineering, Velammal Institute of Technology, Chennai, Tamil Nadu, India

⁶Department of Mechanical Engineering, Graphic Era Deemed to be University, Bell Road, Clement Town 248002, Dehradun, Uttarakhand, India

⁷Department of Mechanical Engineering, College of Engineering and Technology, Mettu University, Metu 318, Ethiopia

Correspondence should be addressed to Prabhu Paramasivam; prabhu.paramasivam@meu.edu.et

Received 11 October 2022; Revised 25 December 2022; Accepted 27 March 2023; Published 20 April 2023

Academic Editor: S. K. Khadheer Pasha

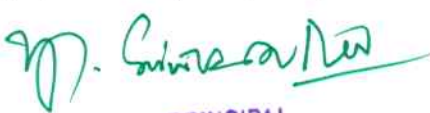
Copyright © 2023 L. Natrayan et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

One of the more enticing, ecologically responsible, as well as safe and sustainable methodologies is eco-friendly nanomaterial synthesis. Vegetation materials will be used as reductants instead of toxic substances for synthesising nanoparticles. The current study used *Ruellia tuberosa* (RT) leaf extract digest to synthesise FeO nanomaterials, which were then characterised using XRD. Following that, microbially produced FeO molecules were mixed with a Kevlar-based polymeric matrix to study the blended consequences. To examine the interbreeding, the current experimental analyses were performed, including both static and dynamic mechanical characteristics. The addition of FeO nanofillers improved the elastic modulus, tensile strength, and storage modulus of the nanocomposite. Impact force uptake has been raised to a certain extent by the addition of nanoparticles. The findings of this research show that incorporating FeO nanofillers into Kevlar fabrics is a promising technique for increasing the mechanical characteristics of hybrid laminated composites. As per DMA evaluation, the sample without nanomaterials had a more volcanic lava response, which is a useful thing for body systems for missile use. Another critical aspect of a nanoparticles-filled nanocomposite that must be addressed is the relatively uniform scattering of padding as well as the development of interfacial adhesion in such a combination. The presence of FeO fillers in polymeric composites is confirmed by XRD analysis.

1. Introduction

Nanomaterials seem to be a promising as well as rapidly expanding scientific discipline that is trying to fill shortfalls in contemporary advanced components. Nanoscience has also advanced in the sector of nanotechnologies over the last two decades. Nanomaterials (NPs) are fine pieces with diameters varying from 0 to 100 nm [1]. The compositional distinctiveness of NPs, such as diameter, structure, and

fractal, has also enhanced their use in digital equipment, biomedicine, pharma, and textile manufacturing, as well as biological markers and biosensing. The intersection of chemical synthesis as well as nanotechnology opens up an amazing new frontier for the creation of sustainable and clean multipurpose nanomaterials [2, 3]. Aside from precious metals, bioactive synthesis of metal nanoparticles has already been expanded to a variety of metal oxides with intriguing properties. Multipurpose nanocrystals (IONPs)


PRINCIPAL
SRISIVANI COLLEGE OF ENGINEERING
Chilakapalem Jn., SRIKAKULAM

Research Article

Biosynthesis-Based Al_2O_3 Nanofiller from *Cymbopogon citratus* Leaf/Jute/Hemp/Epoxy-Based Hybrid Composites with Superior Mechanical Properties

L. Natrayan,¹ Yenda Srinivasa Rao ,² Puthalapattu Reddy Prasad,³ Kul Bhaskar,⁴ Pravin P. Patil,⁵ and Dereje Bayisa Abdeta ⁶

¹Department of Mechanical Engineering, Saveetha School of Engineering, SIMATS, Chennai, Tamil Nadu 602105, India

²Department of Mechanical Engineering, Sri Sivani College of Engineering, Srikakulam, Andhra Pradesh, India

³Department of Chemistry, Institute of Aeronautical Engineering, Dundigal, Hyderabad 500043, India

⁴Department of Botany, Government Degree College Sukrauli, Kushinagar, Uttar Pradesh, India

⁵Department of Mechanical Engineering, Graphic Era Deemed to be University, Bell Road, Clement Town 248002, Dehradun, Uttarakhand, India

⁶Department of Civil Engineering, Ambo University, Ambo, Ethiopia

Correspondence should be addressed to Dereje Bayisa Abdeta; dereje.bayisa@ambou.edu.et

Received 6 October 2022; Revised 29 January 2023; Accepted 5 April 2023; Published 20 April 2023

Academic Editor: S. K. Khadheer Pasha


Copyright © 2023 L. Natrayan et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Metallic nanoparticles (NPs) manufactured by ecofriendly strategies have also received much interest because of their elastic scattering properties and performance in nanomaterials. Aluminium oxide nanomaterials stand out among nanomaterials due to their tremendous uses in ceramic products, fabrics, therapeutic agents, catalyst supports, sewage sludge, and biosensors. The current paper investigates the effect of the nanoparticle composition and layer sequential on the mechanical characteristics of jute (J)-hemp (H) incorporated with an aluminium oxide polymer composite. NaOH is used to change the physical aspects of both plant fibres. A total of 20 specimens were tested with varying stacking sequences and padding weight ratios. Mechanical properties like a nanocomposite's tension, bending, and ILSS was measured. Stacked series and flowability substantially impact the nanocomposite. The Group 3 nanocomposite with 2% Al_2O_3 has the highest tensile strength, 54.28% of the Group 1 and 2 combinations. The stack series significantly influences the material properties of nanomaterials. Because of the alternating layers of natural fabrics, Group 4 specimens have the maximum flexural strength. Group 3 composite materials have the highest ILSS because they have hemp on the outermost surface. It has been discovered that Group 4 material with a 2% Al_2O_3 concentration is possibly the most substantial material. The existence of Al_2O_3 nanoparticles in the green synthesis was confirmed by XRD analysis.

1. Introduction

With the advancement of the technological world, the demand for breathable, excellent mechanical properties and low-cost materials grows daily. Comprehensive studies in lightweight materials are driven by the growth of slightly elevated components [1]. As a result, scientists are interested in developing new laminates with various types of fibres using polymer composite materials. Organic fibres' appealing characteristics, like minimal price, ease of access, low

toxicity, and biocompatibility, encourage developers to use them as reassurance besides substituting a few artificial reinforcing materials in composite materials [2]. Nowadays, polymer nanocomposites have a broad array of applications in many fields, including the aircraft industry, amicable, automotive, and security apparatus, due to their excellent properties such as certain rigidity and high modulus as chemical stability. Fibre-reinforced polymers can be fabricated in massive amounts and seem harder, softer, and much more feasible than traditional structural steel [3]. The


- PRINCIPAL
SRI SIVANI COLLEGE OF ENGINEERING
Chitakapalem Jn., SRIKAKULAM

Two-degree-of-freedom tilt integral derivative controller-based firefly optimisation for automatic generation control of restructured power system

Gorripotu Tulasichandra Sekhar

Department of EEE,
Sri Sivani College of Engineering,
Srikakulam, Andhra Pradesh, India
Email: gtchsekhar@srisivani.com
Email: gtchsekhar@gmail.com

Ramana Pilla*

Department of EEE,
GMR Institute of Technology,
Rajam, Andhra Pradesh, India
Email: ramana.pilla@gmrit.edu.in
Email: pramana.gmrit@gmail.com

*Corresponding author

Ahmad Taher Azar

College of Computer & Information Sciences,
Prince Sultan University,
Riyadh, Saudi Arabia
and
Faculty of Computers and Artificial Intelligence,
Benha University,
Benha, Egypt
Email: aazar@psu.edu.sa
Email: ahmad_t_azar@ieee.org
Email: ahmad.azar@fci.bu.edu.eg

Mudadla Dhananjaya

Department of EEE,
Anil Neerukonda Institute of Technology & Sciences,
Visakhapatnam, Andhra Pradesh, India
Email: dhanueee203@gmail.com

Abstract: The present work proposes a two degree of freedom tilt integral derivative (2-DOFTID) controller tuned with a firefly algorithm (FA) for a two-area automatic generation control (AGC) power system. Initially, a standard two-area power system is tested to show the superior output of the proposed controller relative to other control strategies. After that, the 2-DOFTID controller for the next test system is continued as a secondary controller; it is a restructured power system. It consists of thermal, hydro and wind systems for area-1 and thermal, hydro and diesel systems for area-2. In addition, the operation of the Unified Power Flow Controller (UPFC) and redox flow battery (RFB) is analysed. Finally, a robustness study was carried out and the simulation results showed that 2-DOFTID plus UPFC and RFB integrated system performed better than others under all scenarios of restructured power system.

Keywords: AGC; automatic generation control; firefly algorithm; random load disturbance; RFB; redox flow battery; 2-DOF-TID; two degree of freedom tilt integral derivative controller; UPFC; unified power flow controller.

Frequency regulation of hybrid power system using firefly algorithm

Tulasichandra Sekhar Gorripotu

Department of Electrical and Electronics Engineering,
Sri Sivani College of Engineering,
Srikakulam, Andhra Pradesh – 532410, India
Email: gtchsekhar@srisivani.com
Email: gtchsekhar@gmail.com

Ramana Pilla*

Department of Electrical and Electronics Engineering,
GMR Institute of Technology,
Rajam, Andhra Pradesh – 532127, India
Email: ramana.pilla@gmrit.edu.in
Email: pramana.gmrit@gmail.com
*Corresponding author

Abstract: In the present work, firefly algorithm (FA)-based cascaded PD-PID with filter controller (PD-PIDF) is implemented for the hybrid power system to keep the frequency within the limits. At first, a two-area hybrid power system is proposed, considering thermal and distributed power units in area 1, and hydrothermal units in area 2. The cascaded PD-PIDF controller parameter values are optimised using the integral time multiplied absolute error (ITAE) criterion. The proposed system is analysed under three cases by applying step load perturbations (SLPs) and noise signals at possible areas. The superiority of cascade PD-PIDF controller is shown by comparing with recently published results. Finally, sensitivity analysis is performed to demonstrate the cascaded PD-PIDF controller capability while varying system parameters and conditions.

Keywords: cascaded PD-PIDF controller; distributed power system; firefly algorithm; frequency regulation; hybrid power system.

Reference to this paper should be made as follows: Gorripotu, T.S. and Pilla, R. (2022) 'Frequency regulation of hybrid power system using firefly algorithm', *Int. J. Innovative Computing and Applications*, Vol. 13, No. 2, pp.88–96.

Biographical notes: Tulasichandra Sekhar Gorripotu received his PhD from the Department of Electrical Engineering, Veer Surendra Sai University of Technology, Burla, Odisha, India. His research interests include applications of soft computing techniques to power system engineering. To his credit, he has published 42 papers in international and national journals/conferences of repute, and also authored/co-authored two books. He is acting as a guest editor and reviewer for some reputed international journal publishers such as Elsevier, Springer and Inderscience, etc. Presently, he is working as an Associate Professor at the Department of EEE, Sri Sivani College of Engineering, Srikakulam, Andhra Pradesh, India.

Ramana Pilla is a Professor at GMR Institute of Technology, Rajam, Andhra Pradesh, India where he has been teaching for the past 19 years. He received his BTech in EEE, MTech in Electrical Power Engineering and PhD in EEE from JNTUH, Hyderabad. He was authored/co-authored nine textbooks; out of which six textbooks from Schand Publications, two textbooks from Universities Press (India) Pvt. Ltd. and one text book from Reem Publications Pvt. Ltd. He has published/presented 48 papers in international and national journals/conferences of repute. His research interest includes state estimation and controller design for electrical drives, automatic generation control, and application of soft computing techniques to electrical power systems. He was a life member of ISTE, IE (India) and member of several academic bodies.



COMPUTATIONAL ANALYSIS OF A KNUCKLE JOINT AND IMPLEMENTATION OF THE GENERALIZED REGRESSION NEURAL NETWORK

3260

J. Bala Bhaskara Rao¹, M. Jayanthi Rao^{2*}, Sura Paparao³, A.D.S. Saketh⁴, Penta Anjaneyulu⁵

¹Department of Mechanical Engineering, SSCE, Srikakulam, JNTU-GV, India.

^{2*}Department of Computer Science & Engineering, AITAM, Tekkali, India.

³Department of Computer Science & Engineering, AITAM, Tekkali, India.

⁴Department of Mechanical Engineering, SSCE, Srikakulam, JNTU-GV, India.

⁵Department of Computer Science & Engineering, AITAM, Tekkali, India.

*Corresponding author

E-mail address: jayanth.mtech@gmail.com

ABSTRACT

A Knuckle joint can be used to connect two rods that are under tensile force. This joint permits an angular misalignment between the rods and can support compressive load when it is controlled. The joints are used to make different kinds of connection i.e. tie rods, tension links in bridge structure. In this case, one of the rods has eyes at the rod's ends and the one end is forked with eyes at both legs. Pin (knuckle pin) is put through the rod's end and fork eye and held by a collar as well as split pin. Normally, empirical relationships can be found to determine the various sizes of the joint, and they are secure from a design perspective. The purpose of this paper is to determine the stresses within Knuckle joint using the analytical method. Further studies in this direction is possible by using different ways of contact, as well as the capability to handle loads. This research focuses on the type of meshing that is the best for components. The knuckle joint model is created using CATIA V6 R20. Later the model is loaded into the ANSYS 15.0 and is then implemented in both meshes, which are hexagonal and tetra mesh. A lot of industrial systems utilize knuckle joints, which is made up of two components which are cast iron and steel. We are proposing modifications of the materials Steel, AL 6061-T6 and Teflon. The structural analysis was conducted for the Knuckle Joint at loads of 100N, 105N and 110N as well as 115N. The most effective combination of parameters such as Von Mises stress and equivalent shear stresses, shear stress, deformation, as well as weight loss for the knuckle joint was determined using ANSYS software. Teflon offers more factors of security, it is lighter and stiffness, as well as reduce stress, and is more rigid than other materials. Based on the findings, the machine learning method i.e. the neural network program that studies deformation, shear stress and von-Mises stresses, widely called Generalized Regression Neural Network (GRNN) was developed. The process involves defining specific variables for input (Different Materials and Loads) as well as output parameters which have been pre-defined and are readily available (Shear Stress, Von-Mises stresses and deformation)

Keywords: GRNN, Knuckle Joint, Von-Mises Stresses, Machine Learning, Shear Stress

DOI Number: 10.14704/NQ.2022.20.12.NQ77331

NeuroQuantology2022;20(12): 3260-3271

INTRODUCTION

A knuckle joint can be described as a mechanical connection designed to join two rods that are under the pressure of a tension

load. This is in situations where a need of a minimal quantity in flexibility or angular force is required. There is always an axial as well as a linear line motion of the load.





OPTIMIZING THE DESIGN OF A FLY WHEEL USING MACHINE LEARNING

J. Bala Bhaskara Rao¹, M. Jayanthi Rao^{2,*}, M. Srinivasa Rao³, A.D.S. Saketh⁴, T. Ravi Kumar⁵

¹Department of Mechanical Engineering, SSCE, Srikakulam, JNTU-GV, India.

²Department of Computer Science & Engineering, AITAM, Tekkali, India.

³Department of Computer Science & Engineering, Adikavi Nannaya University, Rajamahendravaram, India.

⁴Department of Mechanical Engineering, SSCE, Srikakulam, JNTU-GV, India.

⁵Department of Computer Science & Engineering, AITAM, Tekkali, India.

2533

*Corresponding author

E-mail address: jayanth.mtech@gmail.com

ABSTRACT

Flywheels are an inertial storage device for energy. It is a mechanical energy absorber and acts as a storage device which stores energy whenever the energy supply is more than the demand, and then releases it when demand for energy exceeds the supply. The flywheel in machines functions as an accumulator, which stores energy when energy input is higher than the demand and releases it when there is a demand for energy higher than the energy input. The internal combustion engine is based on flywheels. The load placed on the flywheel grows and the stresses increase, so too do the loads and stress. The model of the steering wheel is designed using the CATIA tool, and then imported into ANSYS to be analyzed. The Finite Element Analysis is utilized to calculate the stress in the flywheel. The analysis of the flywheel was conducted on a single component. On the massive flywheel with cast iron (Ultimate stress-214Mpa Density-7510 kg/m³ Poissons Ratio-0.23) the stresses in the flywheel are analyzed and estimated. The web type also analyzes the same material. The third type studies the steering wheel wire analyzes the stress within the steering wheel and then compares the results of 3 steering wheels. The radio steering wheel was modelled with modeling software like CATIA and ANSYS and the results taken and subsequently an analysis of the exact direction of the steering wheel and the proper speed could be identified. Based on the results, machine learning technique i.e., a neural network program to study strain and stress that is known as Generalized Regression Neural Network (GRNN) was designed. This process involves defining certain input parameters (geo, speed and thickness) and output parameters that are pre-defined are immediately available. (weight, strain and stress).

Keywords: Flywheel, GRNN, Stress, Deformation, FEA, Cast Iron, Machine Learning

DOI Number: 10.14704/NQ.2022.20.12.NQ77234

NeuroQuantology2022;20(12): 2533-2541

Introduction:


Flywheels are mechanical device that pivots that can be used as a storage device for Rotational Energy. Flywheels possess a crucial moment of inertia. They thus resist variations in the speed of rotation. The amount of energy that is stored in a flywheel

corresponds to its square rotating speed. Energy is transferred into a flywheel through applying the force on it, thereby increasing its speed, and in turn the energy it stores. However, the flywheel releases put away energy through the application of the force of a mechanical load which in turn reduces its speed of rotation. The principle of the




Design of a Fuzzy Logic Controller for Short-Term Load Forecasting With Randomly Varying Load

D. V. N. Ananth, Raghu Institute of Technology, Modavalasa, India


 <https://orcid.org/0000-0002-0938-2901>

Lagudu Venkata Suresh Kumar, GMR Institute of Technology, India

Tulasichandra Sekhar Gorripotu, Sri Sivani College of Engineering, India

 <https://orcid.org/0000-0002-4442-2147>

Ahmad Taher Azar, College of Computer and Information Sciences, Prince Sultan University, Riyadh, Saudi Arabia & Faculty of Computers and Artificial Intelligence, Benha University, Benha, Egypt

 <https://orcid.org/0000-0002-7869-6373>

ABSTRACT

Short-term load forecasting (STLF) is an integral component of energy management systems. In this paper, fuzzy logic-based algorithm is used for short-term load forecasting. The load changes over time and the goal is to satisfy the shift in demand and to maintain a fault as low as possible between the reference and real powers. The error in the load demand in mega-watt (MW) is compared with proposed technique as well as conventional methods. Three cases were investigated in which the load changes were 1) more random in nature, but the variance to the reference was more; 2) the random load changes were simpler, but a little different from the reference; and lastly, 3) the load changing was random, and the reference deviation was maximum. The results are analyzed for different load changes, and the corresponding results are verified using MATLAB. The deviation of the error value in load response is less experienced with a fuzzy logic controller than with a traditional system, and in fewer iterations, the objective function is also achieved.

KEYWORDS

Energy Management System, Fuzzy Logic, Load Change, Short-Term Load Forecasting

1. INTRODUCTION

The electrical power system is getting tremendous revolution in terms of automation, source and load management for effective utilization of resources (Gorripotu et al., 2019; Pilla et al., 2010, 2019; Fekik et al., 2018a,b,c; Bendakir et al., 2016). For modern grid settings, renewable energy sources including wind and solar are an inevitable aspect of power (Kamal et al., 2020; Abdelmalek et al., 2017,

DOI: 10.4018/IJSKD.2021100103

Copyright © 2021, IGI Global. Copying or distributing in print or electronic forms without written permission of IGI Global is prohibited.

Design and analysis of search group algorithm-based PD-PID controller plus redox flow battery for automatic generation control problem

Ramana Pilla

Department of EEE,
GMR Institute of Technology,
Rajam, Andhra Pradesh, India
Email: pramana.gmrit@gmail.com
Email: ramana.pilla@gmrit.edu.in

Tulasichandra Sekhar Gorripotu*

Department of EEE,
Sri Sivani College of Engineering,
Srikakulam, Andhra Pradesh, India
Email: gtchsekhar@gmail.com
Email: gtchsekhar@srisivani.com

Ahmad Taher Azar*

College of Computer & Information Sciences,
Prince Sultan University,
Riyadh, Saudi Arabia
and
Faculty of Computers and Artificial Intelligence,
Benha University,
Benha, Egypt
Email: aazar@psu.edu.sa
Email: ahmad.azar@fci.bu.edu.eg
Email: ahmad_t_azar@ieee.org
*Corresponding authors

Abstract: The ability of a Redox Flow Battery (RFB) is analysed in the present paper to minimise the tie-line power and frequency deviations of the five-area thermal power system. Initially, a power system network with five areas and a non-linearity of Generation Rate Constraint (GRC) is designed in MATLAB/SIMULINK environment. After that, the values of Proportional Derivative-Proportional Integral Derivative (PD-PID) controller are evaluated for the proposed system by using Search Group Algorithm (SGA). The best control parameters of PD-PID controller are selected by having objective function as Integral Time Multiplied Absolute Error (ITAE). Finally, the RFB is installed in area-1, area-2, area-3, area-4 and area-5 for dynamic response enhancement. Results of simulation show that, better transient response characteristics can be obtained by using PD-PID controller along with RFB in area-1. Further, the system is also tested after inclusion of two RFBs in the control areas. Finally, the robust analysis is also performed to show the capability of the proposed method.

Keywords: dynamic response; generation rate constraint; PD-PID controller; redox flow battery; search group algorithm; transient response.

Reference to this paper should be made as follows: Pilla, R., Gorripotu, T.S. and Azar, A.T. (2021) 'Design and analysis of search group algorithm-based PD-PID controller plus redox flow battery for automatic generation control problem', *Int. J. Computer Applications in Technology*, Vol. 66, No. 1, pp.19–35.

Biography notes: Ramana Pilla is a Professor at GMR Institute of Technology, Rajam, Andhra Pradesh, India where he has been teaching for the past 20 years. He received his BTech degree in EEE, MTech in Electrical Power Engineering and PhD degree in EEE from JNTUH, Hyderabad. He was authored/co-authored 9 text books; out of which 6 text books from SChand Publications,

Tuning of extended Kalman filter using grey wolf optimisation for speed control of permanent magnet synchronous motor drive

Ramana Pilla

Department of Electrical and Electronics Engineering,
GMR Institute of Technology, Rajam, Srikakulam,
Andhra Pradesh, 532127, India
Email: ramana.pilla@gmrit.edu.in
Email: pramana.gmrit@gmail.com

Tulasichandra Sekhar Gorripotu*

Department of Electrical and Electronics Engineering,
Sri Sivani College of Engineering,
Srikakulam, Andhra Pradesh, 532410, India
Email: gtchsekhar@gmail.com
*Corresponding author

Ahmad Taher Azar

Robotics and Internet-of-Things Lab (RIOTU),
Prince Sultan University,
Riyadh, Saudi Arabia
Email: aazar@psu.edu.sa
Email: ahmad_t_azar@ieee.org
and
Faculty of Computers and Artificial Intelligence,
Benha University, Egypt
Email: ahmad.azar@fci.bu.edu.eg

Abstract: This paper deals with tuning of extended Kalman filter (EKF) using grey wolf optimisation (GWO) for sensor less speed control of permanent magnet synchronous motor (PMSM) drive. A real-coded GWO is used to optimise the noise covariance matrices of EKF in an off-line manner. The optimised values of these matrices are injected into the filter, thereby ensuring filter stability and accuracy in the estimation of rotor speed, position and machine states. The estimated speed from EKF is fed back to the speed controller and controller gains K_p and K_i are again tuned using GWO algorithm. The state and measurement covariance matrices improve the convergence of estimation process and quality of the estimated states. The simulation results show the superior performance of the proposed method when compared to particle swarm optimisation (PSO) method.

Keywords: extended Kalman filter; EKF; grey wolf optimisation; GWO; particle swarm optimisation; PSO; permanent magnet synchronous motor; PMSM; PI controller.

Design and implementation of a nonlinear controller and observer for inverter fed permanent magnet synchronous motor drive using dSPACE DS1103 controller board

Ramana Pilla

Department of Electrical and Electronics Engineering,
GMR Institute of Technology,
Rajam, Srikakulam, Andhra Pradesh, 532127, India
Email: ramana.pilla@gmrit.edu.in
Email: pramana.gmrit@gmail.com

Tulasichandra Sekhar Gorripotu*

Department of Electrical and Electronics Engineering,
Sri Sivani College of Engineering,
Srikakulam, Andhra Pradesh, 532402, India
Email: gtchsekhar@gmail.com
*Corresponding author

Alice Mary Karlapudy

Department of Electrical and Electronics Engineering,
Gudlavalleru Engineering College,
Gudlavalleru, Andhra Pradesh, 521356, India
Email: k.alicemary@gmail.com

Abstract: This paper proposes a control system for the speed control of permanent magnet synchronous motor (PMSM) drive through hardware implementation using dSPACE DS1103 controller board. The proposed control scheme consists of two loops such as the inner current loop and outer speed loop. In the inner current loop a nonlinear full order observer (NFOO) along with the state feedback controller (SFC) is used; whereas in outer speed loop PI controller is used as speed controller. The proposed NFOO estimates all the states of PMSM and fed back to the SFC. A nonlinear controller (NLC) is designed along with SFC, to cancel out the system nonlinearity using the concept of exact feedback linearisation. Also the pole placement technique is implemented in order to shift all the poles to left half of the s-plane resulting the system stable in spite of uncertainties and parameter imperfections. The speed and position information of the PMSM is obtained using an encoder. The proposed control scheme has been extensively simulated under various conditions and verified experimentally through dSPACE DS1103 controller.

Keywords: permanent magnet synchronous motor; PMSM; state feedback controller; SFC; dSPACE DS1103 controller; pole placement; nonlinear full order observer; NFOO; exact feedback linearisation; nonlinear controller; NLC.

RESEARCH ARTICLE

Integrated multi-input DC-DC converter with reduced switches

Mudadla Dhananjaya¹ | Ramana Pilla²  | Tulasichandra Sekhar Gorripotu³ 

¹Dept. of EEE, Anil Neerukonda Institute of Technology & Sciences, Visakhapatnam, India

²Dept. of EEE, GMR Institute of Technology, Rajam, India

³Dept. of EEE, Sri Sivani College of Engineering, Srikakulam, India

Correspondence

Ramana Pilla, Dept. of EEE, GMR Institute of Technology, Rajam, AP-532127, India.
Email: ramana.pilla@gmrit.edu.in; pramana.gmri@gmail.com

Summary

Multi-input converters (MICs) play an important role in integrating the independent energy sources utilized in the grid-connected system and electric vehicle applications. In this scenario, several types of MICs are presented in the literature. Most of the MICs are operated using a time-sharing scheme. This leads to a restricted duty cycle which limits the energy source utilization and output voltage. To overcome the above-mentioned limitations, a multi-input single-output converter is proposed. The utilization of energy sources and output voltage can be improved with a reduction in the part count. A 400 W prototype is designed to check the feasibility of the proposed system, and the subsequent simulation and experimental results are validated.

KEYWORDS

boost converter, DC-DC converter, electric vehicle (EV), multi-input converter (MIC), multi-input single-output (MISO) converter

1 | INTRODUCTION

Multi-input converters (MICs) are attracted in interfacing the independent energy sources utilized in grid-connected and electrical vehicle applications. Furthermore, compared to several separate dc-dc converters, MICs require fewer components count and compact structures [1,2]. This leads to reducing the complexity and cost of the converter and also higher power density. Therefore, MICs are a good choice for grid-connected systems, renewable energy sources (RESs), and electric vehicle (EV) applications [3,4].

In Ref. 5, the simple structure of the multi-input single-output (MISO) converter is suggested to connect the independent energy sources to a common load while achieving a lower count of the modules. However, bidirectional power flow may not be possible and an additional converter is required for inverting the output voltage. A noninverting multi-input (MI) converter is introduced in Ref. 6. It can perform the boost, buck, and buck-boost (BB) operations and also has achieved the bidirectional capability. Nevertheless, one input port at a time is allowed to deliver energy. Further, this topology is extended with battery usage for EV applications with the integration of RESs in Ref. 7. Similarly, the

List of symbols and abbreviations: BB, buck-boost; CCM, continuous conduction mode; DCM, discontinuous conduction mode; DISO, dual-input single output; EV, electric vehicle; FC, fuel cell; MI, multi-input; MIC, multi-input converters; MISO, multi-input single-output; PV, photo voltaic; PWM, pulse width modulation; RES, renewable energy source; RMS, root mean square; UC, ultra-capacitor; VCO, voltage-controlled oscillator; D , duty cycle; D_{max} , maximum duty ratio; f_s , switching frequency; i_F , forward current; $R_{L,max}$, maximum load resistance; R_{on} , switch ON-state resistance; T , switching period; T_j , junction temperature; T_{HS} , hot spot temperature; T_A , ambient operating temperature; ΔT , ambient temperature; $V_{C,pp}$, peak-to-peak value of the capacitor; V_O , output voltage; V_r , ripple voltage; V_{FD} , threshold voltage; λ_{system} , system failure rate; λ_b , base failure rate; π_Q , quality factor; π_A , application factor; π_C , contact construction factor; π_E , environmental factor; π_T , temperature factor; π_S , electrical stress factor; π_{SR} , series resistance factor; π_C , capacitance factor; π_V , voltage stress factor.



PRINCIPAL
SRI SIVANI COLLEGE OF ENGINEERING
Chiakapalem Jn., SRIKAKULAM

A BRIEF STUDY ON IOT CONCEPTS

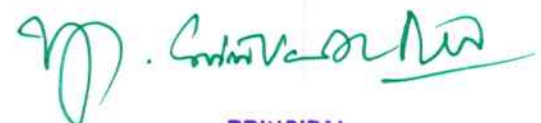
V.Yamuna , D.Priyanka

Abstract: The Internet of Things (IoT) describes the network of physical objects that are embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the internet. These devices range from ordinary household objects to sophisticated industrial tools. With more than 7 billion connected IoT devices today, experts are expecting this number to grow to 10 billion by 2020 and 22 billion by 2025.the major applications of iot are: home applications , smart cities ,energy and environmental resources, health and fitness etc .The scope of iot device is not only connected to the internet and also exchange the information between devices. IoT empowers users to communicate and control physical devices to salvage vital information. Large amounts of data will be generated and exchanged which in turn will help in decision making. As the network grows the size of the communicating and processed data also increases. The large data can be stored in cloud and can be retrieved from cloud data bases. But dynamic reading and storage is a biggest challenge for embedded systems used in IoT. For storing real time data entity high speed data RAMs and internal storage devices are embedded in IoT modules. This paper describes the architecture, protocols used in IoT, applications like home, smart cities, health, emerging technologies used in Iot.

Keywords: IOT, protocols , emerging technologies , home , city, health-applications.

1. INTRODUCTION

IoT comprises things that have unique identities and are connected to internet. By 2020 there will be a total of 50 billion devices connected to internet. IoT is not limited to just connecting things to the internet but also allow things to communicate and exchange data. The main characteristics of iot are: Iot devices and systems may have the capability to dynamically adapt with the changing contexts and take actions based on their operating conditions, user's context or sensed environment. the surveillance system is adapting itself based on context and changing conditions. Iot Allows a large number of devices to work together to provide certain functionality called self-configuration. It supports a number of interoperable communication protocols and can communicate with other devices and also with infrastructure. Each IoT device has a unique identity and a unique identifier(IP address).Integrated into Information Network allow them to

A handwritten signature in green ink, appearing to read 'V. Yamuna'.

PRINCIPAL
SRI SIVANI COLLEGE OF ENGINEERING
Chilakapalem Jn., SRIKAKULAM

Statistical Analysis of Various Measures in Auditing Practices Using Optimization Techniques

Dabbeeru Priyanka¹, Javvadi Vishnu Priyanka², Sura Papa Rao³

Department of Computer Science and Engineering,
¹Sri Sivani College of Engineering, Srikakulam, AP-532410, India
²RGUKT-Srikakulam, ³RGUKT-Nuzvid, Andhra Pradesh, India

E-mail : {dabbeerupriyanka90, priyajv34, surapaparao}@gmail.com

ABSTRACT

Now a day, AI assumes a fundamental job in improving the nature of a audit field work. A data audit refers alludes to the inspecting of information to evaluate its quality or utility for a particular reason. Assessing or auditing information, not at all like inspecting accounts, includes looking at key measurements, other than amount, to make decisions about the properties of an informational index. Auditing practices are liable for fraud detection. In this paper, various optimization algorithms are executed by analysing statically measures of audit risk and trail data to find the better accuracy for suspicious firm classification and will produce an optimum or a satisfactory solution.

1. INTRODUCTION

1.1 Introduction to Audit data

One major area of auditing is the making of beneficial prediction about a dataset. The auditors are required by auditing standards to assess the status of a dataset and make a prediction as to whether the dataset is able to continue operating as a going concern [1].The greatest concerns in using audit data for research are missing and implausible data, which are inevitable when large volumes of data are, collected [2]. Determining the advantageous status of a dataset is a very difficult task, so auditors have been trying to come up with statistical methods to help make it easier. In recent years, machine learning has developed and received major attention in the predictive analytics in audit research. The main objective is to produce an efficient and effective prediction



PRINCIPAL
SRI SIVANI COLLEGE OF ENGINEERING
Chilakapalem Jr., SRIKAKULAM

Evaluation of Knuckle Joint Performance with Altered Materials by Executing a Smart Prediction Tool

J. BalaBhaskara Rao, J. Siddhartha Yadav, M.Jayanti Rao, M.Srirama

¹Department of mechanical engineering, SSCE, JNTUK, India.
(drjbbrao@gmail.com)

²Department of mechanical engineering, REC, JNTUK, India.
(siddhu.vitam@gmail.com)

³Department of computer science engineering, SVCE, JNTUK, India.
(jayanth.mtech@gmail.com)

⁴Department of mechanical engineering, RIT, JNTUK, India.
(srirama.merka@gmail.com)

Abstract

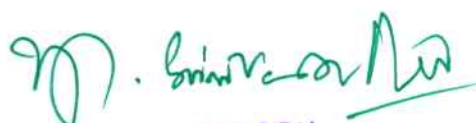
The joint usually used to connect load under tensile stress is known as Knuckle joint. This works deals with numerical technique of altering materials like Steel, AL 6061-T6 and Teflon & calculating the parameters of maximum principal stress & maximum shear stress. Structural analysis was carried out on the Knuckle Joint at loads of 100N to 185 N. The best combination of parameters like deformation, shear stress and principal stresses for knuckle joint were calculated. From the results Teflon has more factor of safety and reduce the stress, weight than other material. After getting 54 numerical results 48 data sets are considered as a trainee data to establish mathematical relations between input and output parameters by using generalized regression neural networks and 6 data sets are used to test the trainee data. The established prediction tool is good agreement with trainee data and tested with an accuracy of 99.98%. The main advantage of GRNN is, without conducting experiments estimate the output values for a given inputs.

Key words: knuckle joint, generalized regression neural network, deformation, maximum principal stress, maximum shear stress.

*Corresponding Author J.BalaBhaskara Rao

1. Introduction

Knuckle joint is a joint between two sections permitting movement in one plane only. It is somewhat a pivoted joint between two bars. They are generally utilized in tractor trailer, tie rod in roof truss, joint between the links of suspension bridge and utilized in steering system among the steering rod and pinion of the steering gear. The knuckle joint modeled and analyzed under a certain condition with altered geometry and the result shows that 30C8 material having maximum permissible stress with 25 mm pin diameter can stand load of 50 KN [1]. The commercial finite element package ANSYS 15 was used to evaluate the out puts of the connecting rod at different compressive loads [2]. The suggested knuckle joint was analyzed by considering cast iron into a composite polymer material at different loads. The stress and strain are reduced because of high flexibility material [3, 28, 29]. In case of reducing the cost and weight of knuckle joint (17HMBVA)



Experimental and Numerical Analysis of Fluid Flow in Microfibers



Madhusmita Ghadai, Subrat Kumar Barik

Abstract: The flow in small geometries is of interest in applications like bioanalysis systems, micro-valves and flow through porous media. The flow generally straight-forward to predict since the flow is stratified and so the geometries are clear-cut. However, once it involves flow through twin scale porous media, the flow gets harder to predict. The flow-through porous media are usually applied to areas like composites manufacturing, paper making and drying of ore pellets. The aim of this paper is to check flows in small geometries with numerical and experimental ways to realize an enlarged understanding of porous media flow. The optical technique best fitted to this sort of geometries is micro image velocimetry (μ -PIV) and numerical calculations are done with computational fluid dynamics (CFD). μ -PIV is employed to analyze the flow in channels with one fiber and with fiber arrays of various patterns and densities. The impact consistency has on flow fields in channels is investigated with CFD.

Keywords: Computational fluid dynamics, flow through a porous medium, Microimage velocimeter, Micro Fiber.

I. INTRODUCTION

There are two states of fluid flow. When the flow is said to be laminar, it means that the flow is highly ordered and has smooth streamlines. A streamline is defined as a curve that is everywhere tangent to the instantaneous local velocity vector. When the flow has velocity fluctuations and disordered motion, the flow is said to be turbulent. Several parameters affect the transition from laminar to turbulent flow, for instance, the geometry, fluid velocity and material properties of the fluid. The experimental work of Osborne Reynolds in the 1880s led to the conclusion that the transition could be described as a ratio of the inertial forces to viscous forces in the fluid. [1]. This ratio is known as the Reynolds number and is defined as $Re = \rho V L / \mu$. Where,

ρ = density of the fluid,
 V = velocity of the fluid,
 μ = viscosity of fluid,
 L = length or diameter of the fluid.

Reynolds number formula can be used in the problems to calculate the Velocity (V), density (ρ), Viscosity (μ) and diameter (L) of the liquid.

In the case of flow-through micro geometries, the flow is laminar in almost every case because of the small scales involved. The flow can be explained by the equations of fluid motion. The continuity equation and the Navier-Stokes equation is defined as follows

$$\frac{\partial P}{\partial t} + \nabla \cdot (\rho u) = 0$$

$$\rho \left(\frac{\partial u}{\partial t} + (u \cdot \nabla) u \right) = -\nabla p + \rho \nabla^2 u$$

Solving the Navier-Stokes equation for anything except simple flow fields is not possible at this present time since it is a time-dependent, nonlinear, second-order partial differential equation. Since analytical solutions are not possible for more complex cases it is therefore of great interest to analyze these cases experimentally or numerically.

A. Porous media

The flow in porous media has been taken a great interest for a long time. Henry Darcy studied the filtering of drinking water in the city of Dijon as early as 1856. From the experimental observations, he derived a one-dimensional law for fluids propagating through a porous media. His law was theoretically derived and extended to several dimensions to take the form

$$V_s = -\frac{K}{\mu} \nabla p$$

Where V_s [m/s] is the superficial velocity (ratio between volumetric flow rate through the porous medium and the cross-sectional area in the flow direction) and K [m²] is the permeability tensor of the porous medium [2].

The law is valid as long as the Reynolds number is low enough to ensure laminar flow, the fluid is incompressible and Newtonian and the porous domain is stationary.

B. Optical measuring methods

Optical measuring methods have been used for several years. These kinds of methods are well suited for fluid mechanical problems since mechanical methods tend to disturb the flow. Among the first to use tracker particles to monitor flows was Ludwig Prandtl. At the beginning of the 1900s, he performed experiments on the flow around objects in a water tunnel where particles were introduced to the surface of the flow.

Manuscript received on February 10, 2020.
Revised Manuscript received on February 20, 2020.
Manuscript published on March 30, 2020.

* Correspondence Author

Madhusmita Ghadai*, Assistant Professor, GMR Institute of Technology and Management, Rajam, Srikakulam. Andhra Pradesh, India.

E-mail: madhusmita.g@gmrit.edu.in

Subrat Kumar Barik, Assistant Professor, Mechanical Engineering, Sri Sivani College Of Engineering, Srikakulam, Andhra Pradesh, India.

E-mail: subrat_ssce@gmail.com

© The Authors. Published by Blue Eyes Intelligence Engineering and Sciences Publication (BEIESP). This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

Retrieval Number: F8519038620/2020©BEIESP
DOI:10.35940/ijrte.F8519.038620
Journal Website: www.ijrte.org

3275

Published By:
Blue Eyes Intelligence Engineering
& Sciences Publication



(Signature)
PRINCIPAL
SRI SIVANI COLLEGE OF ENGINEERING,
Chilakapalem Jn., SRIKAKULAM

Performance Analysis of Grid Synchronization Method for Three-Phase Three-Wire Networks under Grid Fault Conditions

Tulasichandra Sekhar Gorripotu¹, Krishna Mohan Tatikonda², B. Omkar Lakshmi
Jagan³

¹Associate Professor, Department of EEE, Sri Sivani College of Engineering
Chilakapalem, Srikakulam, A.P

²Associate Professor, Department of EEE, Andhra Loyola Institute of Engg &
Tech, Vijayawada, India

³Research Scholar, Department of EEE, Koneru Lakshmaiah Education Foundation,
Guntur, India

Abstract

In this paper, very important in the control of grid-connected electrical power converter by using synchronization algorithms employed, as quick and error less detection of the grid voltage is critical in order to apply constant control strategies under grid conditions. This paper represent a proposed grid synchronization method for three-phase three-wire system, namely three-phase improved PLL The enhanced phase-locked loop (EPLL) is a synchronization system that has proven to provide better output in single phase synchronization systems. An EPLL is fundamentally an adaptive band pass filter, which is able to vary the cutoff frequency as a utility of the input signal. in order to eliminate the positive-sequence vector of three phase signal if formation was adaptive later. Different propose problem is there when synchronization. in addition, synchronizing method with particularly unbalanced grid is proven by means of by using simulation and its performance.

Key words: Grid, Power converters, EPLL

1. Introduction

These days, the usage of depth gadgets and statistics and correspondence innovation (ICT) applications are key troubles inside the improvement of future electrical structures. The excessive entrance of sustainable electricity sources, for example, wind energy and photovoltaic, skilled in the most recent decades is a proper version, as each age frameworks are associated with matrix notice that electricity converter based totally framework, that pressure conveyed to the system ought no longer limited with the aid of the framework. Under preferred circumstance they ought to be deliver of lattice stability , bolster the network voltage simply as recurrence. Central remember of reason of everyday (PCC)coupling is the large troubles even as utilizing the converter..Although beneath typical hobby conditions, the lattice sinusoidal and voltage are adjusted. Under these situations, network associated energy converters need to be fairly planned with the matrix if you want to continue to be vigorously related, at the bottom of the framework administrations and preserving the age going .By and large these are currently a day's formers required. In all framework codes(GCs)for the affiliation of circulate produced frameworks to the system, where the criteria for the infusion of receptive force and dynamic force below lopsided and altered condition are additionally given.

Regardless of the manner that the elements of lattice uniting are not constructed up within





Evaluation of thermal performance and implementation of prediction tool in a heat exchanger with elliptical leaf strips

J. Bala Bhaskara Rao¹ · J. Siddhartha Yadav²

Received: 29 May 2019 / Accepted: 30 June 2020
© Springer-Verlag GmbH Germany, part of Springer Nature 2020

Abstract

In order to enhance thermal efficiency, most process industries are fitted with heat exchangers. Without using external power, we can increase the heat transfer rate by providing different strips in tubes. This paper deals with the passive method of elliptic leaf insertion in a double pipe heat exchanger with opposite orientation and same direction and the heat transfer rate and pressure drop are found. The double elliptical leaf used in experiment has major to minor axes ratios as 2:1 and distance of 50 mm between two leaves are arranged at different angular orientations from 0° to 180° with 10° intervals. Experimental and numerical simulations are carried and the thermal performance is evaluated at various Reynolds number. Nusselt number increases with increases of Reynolds number and among all elliptical leaf angles, 60° leaf angles gives more heat transfer rate because of high surface area and secondary flows near by the walls of the tube. Friction factor decreases with increased Reynolds number. From the obtained experimental results, a statistical tool generalized regression neural network is considered where the output values are obtained by giving known input parameters without conducting any experimentation.

Keywords Nusselt number · Friction factor · Elliptic leaves · GRNN · Accuracy

1 Introduction

Heat exchangers play a major role in our day to day life activities. From the geysers which we use early in the morning, cold water in refrigerator to the heater or air conditioners which we use while sleeping all are adjudged to be the offspring of heat exchangers only. Hence, we are surrounded by various heat exchanger devices in daily activity equipment to large industrial applications. Heat exchangers are a major application-oriented heat transfer device where most of the trails are made. It is a great source as a minute change in the equipment produces certain results or a direction of improvement. In this direction there are generally three types of methods which are used Active method, Passive

method & Compound methods. In case of active method, the equipment design is changed and different output parameters are found giving rise to a conclusion. Common examples being the change in diameter of the tubes or the shell, increasing or decreasing the number of tubes etc. The passive methods focus on improving the outputs by changing certain parts within the equipment. For example, the flow enhancement of fluid, increasing the velocity of fluid or decreasing its velocity, insertion of strips in the path of flow to improve the outputs. The compound method includes the combination of both methods and finding the enhancement in output. It becomes a mark of opinion being a researcher to find ways of increasing the heat transfer rate by which heat exchanger equipment gives a better output. Improvements in heat exchangers are suggested by inserting twisted tapes, increase in baffle space in double pipe heat exchangers [1–3]. Improvement in shell & tube heat exchanger is considered by various methods by adding flower, ring, trefoil hole, plate & doughnut sort to find the heat transfer rates [4] Swirling flow in plain tube increases heat transfer rate for Reynolds's number ranging between 2300 and 10,000 [5] In a plain tube heat exchanger the working fluids of distilled water, glycols, mineral oils are checked for heat transfer enhancement [6]. The estimation of heat transfer, pressure drop, overall heat transfer coefficient are found by using strips of different shapes [2]. Effect of plain

✉ J. Bala Bhaskara Rao
raobasijarajapu@gmail.com

J. Siddhartha Yadav
siddhu.vitam@gmail.com

¹ Department of Mechanical Engineering, Sri Sivani College of Engineering, Srikakulam, Andhra Pradesh, India

² Department of Mechanical Engineering, Raghu Engineering College (A), Visakhapatnam, Andhra Pradesh, India


PRINCIPAL
SRI SIVANI COLLEGE OF ENGINEERING
Chilakapalem Jr., SRIKAKULAM

Consequential Prediction of Brain Status and Diagnosis of Epilepsy

¹Dr. G Rajendra Kumar, ¹Professor, Dept. of CSE,

²Suneel pappala, ²Assistant Professor,
Dept. of CSE, IIIT, Srikakulam- 532410, RGUKT, A.P

³Madugula Muralikrishna

³Assistant Professor, Dept. of CSE,

⁴Dr. J. Bala Bhaskara Rao

⁴Professor, Dept. of Mechanical Engineering,

^{1,3,4}Sri Sivani College of Engineering, Chilakapalem Jn., Srikakulam-532410. A.P

⁵J.Nageswara Rao,

⁵Sr.Assistant.Professor, Dept of Computer Science and Engineering,
Lakireddy Bali Reddy College of Engineering (Autonomous), Mylavaram,
Krishna-521230, Andhra Pradesh, India.

Abstract

Seizures cannot be cured and can only be controlled with appropriate drugs. The diagnosis of epilepsy patients aims to determine the type of seizure (epilepsy or non-epilepsy) and its cause, because each type of seizure responds best to a particular treatment. The diagnosis of epilepsy is based on feedback information collected from the patient about family history, age, and other drugs used by the patient for a longer period of time, such as any other diseases used by the patient.

Keywords— EEG, Neuro, Sensors, Entropy, Seizure, Diagnosis

1. Introduction

This paper presents studies on diagnosis of epilepsy and capturing the present status of human brain which are essential to predict whether a human being is in stable condition or he/she is an abnormal state of mind. The objective of this study is to categorize the patient with different mental status.






This can be done with the help of EEG(Electroencephalogram) sensor, which is installed near the brain to capture the present status of the brain at regular intervals. Initially in the training period the images of the brain of a normal person and a patient having epileptic seizures are captured. These are maintained as reference cases. Different case studies are conducted on both normal and patients having the problems of seizures. In these studies the new patient brain signals will be collected and after converting to digital form they will be compared to the model built in the training period. The graphs are compared with proposed algorithm and it finds the entropy value. “Based on the entropy value, we can say whether the person has epilepsy. Therefore, this analysis can not only correctly diagnose patients with seizures, but also predict the future risk probability of normal people [1]”.

2. Motivation

Brain-computer interface (BCI)[2], research has been conducted in a controlled environment for approximately forty years to minimize EEG artifacts caused by the subject's movement or other interference effects. In this paper, we propose the approximate entropy (ApEn), which is a kind of statistics that quantifies the regularity of time series

ApEn is a time-related function that helps to classify complex systems. “ApEn is a recently developed statistical parameter used to quantify the regularity of time series data of physiological signals[3]”. Several functions have been reported to detect and predict seizures. Some of them deploy single linear analysis to nonlinear dynamic analysis to detect anomalies.

Intelligent Secure Ecosystem Based on Metaheuristic and Functional Link Neural Network for Edge of Things

Bighnaraj Naik , Member, IEEE, Mohammad S. Obaidat , Fellow, IEEE, Janmenjoy Nayak, Member, IEEE, Danilo Pelusi , Member, IEEE, Pandi Vijayakumar , and SK Hafizul Islam , Senior Member, IEEE

Abstract—Internet of Things (IoT) has evolved for building smart environments in a distributed system, where the data produced by IoT devices are transmitted through Edge computing devices to streamline the flow of traffic from IoT devices to a distributed network. In such a scenario, the attacker introduces many attacks to the edge before forwarding them to distributed servers. This necessitates intrusion detection systems for such environments to mitigate security attacks. This paper has projected a basis for characterization of intrusive behaviors in a distributed system based on the functional link neural nets response weighted-average and teaching–learning metaheuristic with elitism on weight-space. The proposed technique makes use of teaching–learning metaheuristic optimization to obtain suitable parameters for the functional link neural net. Furthermore, the processing of duplicate parameters is successfully avoided by using mutation operation. In addition to this, in this paper the proposed method is found to be more efficient in terms of computational burden.

Index Terms—Edge computing, elitism, functional link artificial neural network (FLANN), Internet of Things (IoT), intrusion detection system (IDS), metaheuristic.

I. INTRODUCTION

EDGE computing facilitates storing and processing of data at the edge of the network, which introduced several data security and privacy preserving challenges [1]. Deploying firewall in the network provides safeguard at network perimeter, but not on entire network host. In Internet of Things (IoT) based smart environments, data security, and privacy preserving ecosystem are also key concerns for which the intrusion detection system (IDS) is viable solution [2] at host level. Unlike firewall security, IDS is competent to achieve internal security by collecting and analyzing the security symptoms data from the network and system resources. In many emerging ecosystems such as health-care, telecommunications, and finance, the huge amounts of data processed by the IoT devices are sent to a distributed servers or cloud server for further processing that demands a secure network ecosystem. Here, the data processed by the IoT devices must be sent securely to the edge devices and distributed servers in a secure way. Metaheuristic optimization and search-based approach have been found efficient for achieving security and privacy in IDS or building network security ecosystem in recent year [3]. Also, optimization algorithms have proven to be a preferred research approach for solving all types of complex problems in industry, businesses, and other allied services. Mostly, nature inspired metaheuristics, which belong to swarm intelligence (SI) are found successful in various industrial applications [4]. The broader classification of population-based algorithms can be of two types such as swarm and evolutionary-based algorithms [5]. Although these algorithms have been successfully applied for solving various diversified applications, there are some issues involved with convergence rate, especially when exclusively applied to any complex problem. In this scenario, hybridizing two or more metaheuristic optimization for complex problem [6] may serve the purpose, but it remains costly in terms of computation. On the other hand, such issues can be avoided by nonextensively employing various controlling parameters such as size of the population, environmental factors, algorithmic parameters, and iterations count. Therefore, by integrating a few improvements/

Manuscript received March 31, 2019; revised May 4, 2019; accepted May 29, 2019. Date of publication June 4, 2019; date of current version January 16, 2020. This work was supported in part by the Science and Engineering Research Board (SERB), Department of Science and Technology (DST), New Delhi, Government of India (Sanction Order No EEQ/2017/000355) and in part by People Republic (PR) of China Ministry of Education Distinguished Possessor under Grant MS2017BJKJ003. Paper no. TII-19-1184. (Corresponding author: Pandi Vijayakumar.)

B. Naik is with the Department of Computer Application, Veer Surendra Sai University of Technology, Burla 768018, India (e-mail: mailtobnaik@gmail.com).

M. S. Obaidat is with the Electrical and Computer Engineering Department, Nazarbayev University, Nur-Sultan 010000, Kazakhstan, with the Korea Advanced Institute of Science & Technology (KAIST), University of Jordan, Amman 11942, Jordan, with the University of Science and Technology, Beijing 100091, China, and also with Amity University, Noida 201313, India (e-mail: msobaidat@gmail.com).

J. Nayak is with the Department of Computer Science and Engineering, Sri Sivani College of Engineering, Srikakulam 532410, India (e-mail: mailforjnayak@srisivani.com).

D. Pelusi is with the Faculty of Communication Sciences, University of Teramo, 64100 Teramo, Italy (e-mail: dpelusi@unite.it).

P. Vijayakumar is with the Department of Computer Science and Engineering, University College of Engineering Tindivanam, Tindivanam 604001, India (e-mail: vijibond2000@gmail.com).

S. H. Islam is with the Department of Computer Science and Engineering, Indian Institute of Information Technology Kalyani, Kalyani 741235, India (e-mail: hafiz786@gmail.com).

Color versions of one or more of the figures in this paper are available online at <http://ieeexplore.ieee.org>.

Digital Object Identifier 10.1109/TII.2019.2920831

Black hole optimised cascade proportional derivative-proportional integral derivative controller for frequency regulation in hybrid distributed power system

Tulasichandra Sekhar Gorripotu*

Department of Electrical and Electronics Engineering,
Sri Sivani College of Engineering,
Srikakulam-532402, Andhra Pradesh, India
Email: gtchsekhar@gmail.com
*Corresponding author

Ramana Pilla

Department of Electrical and Electronics Engineering,
GMR Institute of Technology,
Rajam, Srikakulam, Andhra Pradesh, India
Email: ramana.pilla@gmr.it.edu.in

Abstract: This manuscript presents a novel black hole optimised (BHO) proportional derivative-proportional integral derivative controller (PD-PID) is provided for the optimal solution of the frequency regulation of hybrid power system. At first, a two area power system is considered in which area-1 having thermal, distributed units and in area-2 includes thermal, hydel and nuclear units. Appropriate nonlinearities such boiler dynamics, governor dead band (GDB) and generation rate constraint (GRC) are considered. In the next step, PD-PID controller is considered as a secondary controller and its preeminence is shown by comparing with proportional integral derivate (PID) and proportional integral double derivate (PIDD) controllers for the same model having integral time multiplied absolute error (ITAE) as an error function. Finally, sensitivity of the proposed controller is investigated over a wide variation of system parameters and loading condition. For more examination of the proposed controller is also analysed under random step load and sinusoidal disturbances.

Keywords: automatic generation control; AGC; black hole optimisation; BHO; boiler dynamics; distributed power system; integral time multiplied absolute error; ITAE.

Reference to this paper should be made as follows: Gorripotu, T.S. and Pilla, R. (2019) 'Black hole optimised cascade proportional derivative-proportional integral derivative controller for frequency regulation in hybrid distributed power system', *Int. J. Swarm Intelligence*, Vol. 4, No. 2, pp.155-174.

Biographical notes: Tulasichandra Sekhar Gorripotu received his PhD degree from the Department of Electrical Engineering, Veer Surendra Sai University of Technology, Burla, Odisha, India. His research interests include applications of soft computing techniques to power system engineering. To his credit, he has

Evaluation of a Double Pipe Heat Exchanger by using Double Elliptical Leaf Strips with Opposite Orientation and Same Direction and Executing with a Smart Prediction Tool of GRNN

J. Bala Bhaskara Rao, Ramachandra Raju



Abstract: The world is full of applications with heat exchangers. From the moment a person wakes up to the end of the day everyone is surrounded by heat exchangers. The refrigerators, Air conditioners, automobile radiators, geysers, Sea breeze etc., are the common applications of heat exchangers. Since we are followed by various devices of heat exchangers so change in the output of heat exchangers would gear up the entire applications and change the society into a new phase. This paper aims at one such augmentation method of insertion of elliptical leaf strip in a heat exchanger equipment for the enhancement of thermal performance of the heat exchanger. From the obtained results of experiment a statistical tool of GRNN is used to compare them. Based on both the available values plotting is done to find the percentage of errors between the calculated values.

Keywords: Heat exchangers, elliptical leaf, insertion, GRNN, percentage of error.

1. INTRODUCTION

Analysis of double pipe heat exchangers state that the thermal performance can be improved by various methods like introducing twisted tapes of the tube and pipe, semicircular disc baffles, mechanical turbulators, corrugated twisted tapes [1] Analysis of spiral tube heat exchangers were studied after experimenting them [2]. Comparing heat transfer by analyzing and experimenting and finding the difference between those values. [3] Improvement in effectiveness was studied by introducing triangular fins, trapezoidal cut twisted tape inserts, conical strips, louvered strip. [4] Thermal performance on U bend heat exchanger was studied by introducing twisted tapes turbulators. [6] Various techniques to improve efficiency in double pipe heat exchangers was studied. [8]

Various parameters of double pipe heat exchanger of hot fluid side inner pipe was studied. Modelling and simulation of overall heat transfer characteristics in a double pipe heat exchanger was studied using a black box approach, holed twisted tape. Heat transfer enhancement in circular double tube heat exchanger was studied. [5] Numerical analysis of double pipe heat exchanger with & without strips was analyzed [7] Pipe in pipe heat exchanger was experimented and analyzed by designing it. [9] Multiple shell and tube heat exchangers was studied. [10] Various augmentation techniques was studied for double pipe heat exchangers. Effect of helical tape inserts was studied in this paper. The CFD analysis of double pipe heat exchanger using Nano fluids was studied here. A concentric tube heat exchanger was studied along with its effect when twisted tape inserts are placed. Heat transfer analysis using artificial neural networks approach was studied. [11] Heat transfer was analyzed using prediction tool on various heat exchangers. [12][13] The effect of generalized predictive control was studied [14]. The novelty of this investigation is on the use of a statistical tool named GRNN. (Generalized Regression Neural Network) uses neural network principles giving certain known inputs and finding the outputs. [15] A comparison of the obtained experimental values and GRNN values are made to find the percentage of error from this technique.

Based on these literature survey the passive method of augmentation is used for enhancement of thermal performance in this paper. Two elliptical leaf strips are placed in the tube with same orientation but opposite direction and experimental analysis are done to obtain results. Our novelty is in the implementation of GRNN. A neural network based statistical tool which is used to get outputs by giving predefined inputs. The regression of a dependent variable Y with independent variable X is computed over here. X consists of different mass flow rates, inlet temperatures whereas Y is the outlet temperature.

II. EXPERIMENTAL SETUP

Here a double pipe heat exchanger is used for experimentation made of steel for the outer pipe & copper as the inner pipe.

Manuscript published on 30 September 2019

* Correspondence Author

J. Bala Bhaskara Rao*, Mechanical Engineering, Sri Sivani College of Engineering, Srikakulam, India. drjbbrao@gmail.com

V. Ramachandra Raju, Mechanical Engineering, Jawaharlal Nehru Technology University, Kakinada, India. drvrr59@gmail.com

© The Authors. Published by Blue Eyes Intelligence Engineering and Sciences Publication (BEIESP). This is an open access article under the CC-BY-NC-ND license <http://creativecommons.org/licenses/by-nc-nd/4.0/>

Retrieval Number: C4607098319/19©BEIESP
DOI: 10.35940/ijrte.C4607.098319
Journal Website: www.ijrte.org

1790

Published By:
Blue Eyes Intelligence Engineering &
Sciences Publication



J. Bala Bhaskara Rao
PRINCIPAL
SRI SIVANI COLLEGE OF ENGINEERING
Chilakapalem Jn., SRIKAKULAM

Execution of a Modern Prediction Tool for Evaluation of Thermal Performance in a Heat Exchanger by Expending Triple Elliptical Leaf Angle Strips with Altered Orientation and Opposite Direction



J. Bala Bhaskara Rao, Ramachandra Raju

Abstract: Heat exchangers are the basic devices which are used in many areas wherever applications of heat flow occurs. Its usage varies from common domestic devices to mighty industrial applications. The performance of the heat exchanger plays a very important role for its utilization in many aspects. This performance is not dependent on the design parameters in a particular relationship hence experimental values for thermal performance are taken by utilizing three elliptical leaf strips in a tube and pipe heat exchanger. The three elliptical leaves used in experiment has major to minor axes ratios as 2:1 and distance of 50 mm between two leaves are arranged at different angular orientations from 0° to 180° with 10° intervals. The leaves are placed in the tube side with different orientation and opposite direction of flow and experimentation is conducted to obtain the values. Based on these datasets available a statistical tool is utilized known as GRNN for the comparison between these obtained experimental values & GRNN values. From this comparison the percentage of error between the values is identified as results.

Keywords: Performance, opposite orientation, elliptical leaf strips, GRNN

I. INTRODUCTION

Human comfort is the basic theme for human existence. Heat exchangers plays a very important role in achieving this comfort conditions. To improve the performance of heat exchangers various methods and experimentation were done.

A double pipe heat exchanger was analyzed by adding porous baffles twisted tapes bent strips, shot blasting heat transfer enhancement liners & turbulators to find it's thermodynamic & hydrodynamic performance. ^[1] Experimental analysis was done on concentric tube heat exchangers using various fins configuration. ^[2] Using twisted pipe heat exchangers numerical and experimental analysis was done on heat exchangers. ^[3] Using Nano fluids and baffles the double pipe heat exchangers were numerically & experimentally analyzed. ^[5]

A tube in tube out heat exchanger with helical coil was analyzed to obtain the heat transfer rate. ^[7] Fabrication and standardization of double pipe heat exchanger for laboratory scale was performed. ^[8] Experimental performance of a triple tube heat exchanger was done using a dimple tubing. ^[10] Using different flow configurations experimental & computational technique were investigated on a double pipe heat exchangers. Augmentation in heat transfer coefficient using twisted tape and semicircular cut insert were studied. ^[4] Experimental analysis of heat exchanger was analyzed using Solid works software. Numerical analysis of triple tube heat exchanger was performed using ANSYS software. Condensation heat transfer enhancement of steam at low pressures were experimentally analyzed. ^[6] Analytical study of reliable compartmental model for double pipe heat exchangers were studied. In a helical flow duct a numerical investigation on heat transfer enhancement & flow characteristics were studied fouling in a double pipe heat exchanger was studied in this paper. ^[9] Heat transfer analysis of helical strip insertion with spaced cut sections are studied in a circular pipe. A review on double pipe heat exchanger with CFD analysis was performed in this study. Enhancement of heat transfer rate in a shell and tube heat exchanger using conical tapes were studied. Two phase Nano fluids were studied with twisted tape and helical insertion in the tubes.

Manuscript published on 30 September 2019

* Correspondence Author

J. Bala Bhaskara Rao*, Mechanical Engineering, Sri Sivani College of Engineering, Srikakulam, India. drjbbrao@gmail.com

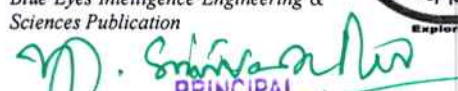
V. Ramachandra Raju, Mechanical Engineering, Jawaharlal Nehru Technology University, Kakinada, India. drvrr59@gmail.com

© The Authors. Published by Blue Eyes Intelligence Engineering and Sciences Publication (BEIESP). This is an open access article under the CC-BY-NC-ND license <http://creativecommons.org/licenses/by-nc-nd/4.0/>

Retrieval Number: C4606098319/19©BEIESP
DOI: 10.35940/ijrte.C4606.098319
Journal Website: www.ijrte.org

1781

Published By:
Blue Eyes Intelligence Engineering &
Sciences Publication


PRINCIPAL
SRI SIVANI COLLEGE OF ENGINEERING
Chilakapalem Jn., SRIKAKULAM



Execution of a Smart Prediction Tool to Evaluate Thermal Performance in a heat exchanger by using Single Elliptical Leaf Strips with altered Angle

J. Bala Bhaskara Rao, Ramachandra Raju



Abstract Heat exchangers are prominent industrial applications where engineering science of heat transfer and Mass transfer occurs. It is a contrivance where transfer of energy occurs to get output in the form of energy transfer. This paper aims at finding a solution to improve the thermal performance in a heat exchanger by using passive method techniques. This experimental and numerical analysis deals with finding the temperature outlets of cold and hot fluid for different mass flow rates and also pressure drop in the tube and the annular side by adding an elliptical leaf strip in the pipe at various angles. The single elliptical leaf used in experiment has major to minor axes ratios as 2:1 and distance of 50 mm between two leaves are arranged at different angular orientations from 0° to 180° with 10° intervals. Since it's not possible to find the heat transfer rates and pressure drops at every orientation of elliptical leaf so a generalized regression neural network (GRNN) prediction tool is used to get outputs with given inputs to avoid experimentation. GRNN is a statistical method of determining the relationship between dependent and independent variables. The values obtained from experimentation and GRNN nearly had precise values to each other. This analysis is a small step in regard with economiastic approach for enhancement in performance of heat exchangers.

Keywords: heat transfer rate, pressure drop, heat exchanger, Elliptical leaf strip, Generalized Regression Neural Network

1. INTRODUCTION

Heat transfer is a broad area of study in engineering science where many topics are learnt with reference to transfer of heat as a form of energy causing major changes in the universe. Indirectly or directly the changes in atmosphere, temperature regulations and flow of winds entirely depends on the heat transfer principles. Hence heat transfer subject is a great path in the field of research. An influential topic in the heat transfer is the study of heat exchangers. Heat exchangers are the devices where the energy flow in the form of heat is transferred from one part to another utilizing which large energy transformations is possible. These energy transfers causes great outputs to industrial applications actually applied in real life. Hence heat exchanger output causes a mighty difference to the society. Hence with this approach various

Using counter flow configuration on a single phase water to water heat transfer was performed by varying the mass flow rates of annulus and the inner tube. [2] Performed the task of researchers have done research with the motto of increasing the output of heat exchangers. [1] Various bended strips were used and an experiment was performed on tube in tube heat exchanger. shot blasting to increase the heat transfer. In this experiment analysis the roughness of outer surface of inner pipe was changed which gave the results of increased heat transfer rate by 43%. [3] They used the finite difference calculus to model the temperature profiles across heat exchangers. [4] They found a method to determine the pipe sizes, pipe lengths, number of bends. The performance was determined by using heat exchanger effectiveness and the fouling factor. [5] Conducted experiment on nanoparticle's concentration effect on Nusselt number and heat transfer characteristics with baffles and without baffles which resulted in enhancement up to 12% for 0.2 % concentration and enhancement up to 22% for 0.1% concentration. All these results were obtained when baffles were used in the experimentation. [6] This paper suggested inserting twisted tape in double pipe heat exchangers which gave positive results of heat transfer coefficient on both tube side and annulus side of heat exchanger. After finding this they even further tested the characteristics of heat transfer enhancement with pressure drop characteristics where there was a negative result for pressure drop with enhancement in heat transfer rates [7] Proposed the use of circular and square longitudinal strips to find the effect on Nusselt number, Pressure drop & overall heat transfer coefficient in a double pipe heat exchangers. The results ascertained the increase in heat transfer rate with increase in mass flow rate and size of the strips. [8] They studied about the use of twisted tapes to increase the heat transfer rates. The results gave the increase in heat transfer rates by using twisted tapes. [9] They found the effect of condensation heat transfer rate by introducing twisted tape. It created swirl generation which increased the contact area resulting in the increase of condensation heat transfer coefficient for steam. [10] Used the technique of baffle spacing in finding better thermal performances. They used the triangular baffles of 100 and 50 mm pitches which increased the values by 1.42 & 1.62 in parallel flow and 1.338 & 1.62 times in counter flow heat exchanger. [11] wrote a review paper on the augmentation of Active, passive and compound techniques. In a plain tube the use of passive and compound techniques produced better results, by using helical tubes also better heat transfer rates and pressure drops was given. [12] studied about the enhancement techniques of double pipe heat exchangers which

Manuscript published on 30 September 2019.

*Correspondence Author(s)

J. Bala Bhaskara Rao*, Mechanical Engineering, Sri Sivani College of Engineering, Sriakulam, India

V. Ramachandra Raju, Mechanical Engineering, Jawaharlal Nehru Technology University, Kakinada, India.

© The Authors. Published by Blue Eyes Intelligence Engineering and Sciences Publication (BEIESP). This is an open access article under the CC-BY-NC-ND license <http://creativecommons.org/licenses/by-nc-nd/4.0/>

Retrieval Number: K1560098119/19©BEIESP

DOI: 10.35940/ijitee.K1560.0981119

Journal Website: www.ijitee.org

Published By:
Blue Eyes Intelligence Engineering
and Sciences Publication (BEIESP)

123 © Copyright: All rights reserved.



J. Bala Bhaskara Rao
PRINCIPAL
SRI SIVANI COLLEGE OF ENGINEERING
Chilakapalem Jn., SRIKAKULAM

Implementation of GRNN for Evaluating the Pressure Drop and Heat Transfer in a Heat Exchanger

By Utilizing Triple Elliptical Leaf Angle Strips With Same Orientation and Opposite Direction

J. Bala Bhaskara Rao, Ramachandra Raju



Abstract: Heat exchangers are the basic devices which are used in many areas wherever applications of heat flow occurs. Its usage varies from common domestic devices to mighty industrial applications. The performance of the heat exchanger shows a very important role for its utilization in many aspects. This performance is not dependent on the design parameters in a particular relationship hence experimental values for thermal performance are taken by utilizing three elliptical leaf strips in a tube and pipe heat exchanger. The three elliptical leaves used in experiment has major to minor axes ratios as 2:1 and distance of 50 mm between two leaves are arranged at different angular orientations from 0° to 180° with 10° intervals. The leaves are placed in the tube side with same orientation and opposite direction of flow and experimentation is conducted to obtain the values. Based on these datasets available a statistical tool is utilized known as GRNN for the comparison between these obtained experimental values & GRNN values. From this comparison the percentage of error between the values is identified as result.

Keywords: Performance, opposite orientation, elliptical leaf strips, GRNN.

I. INTRODUCTION

Heat exchanger is an arrangement which has the capability of improving many industrial applications by enhancing the characteristics affecting its performance. [2] Using hexagonal & semicircular fins comparison was made between the shell and finned tube heat exchanger. The usage of corrugated twisted pipes in place of a normal pipe yields better results in tubular heat exchangers. Introduction of Turbulators in heat exchangers causes drop in fluid pressure. A study of nanoparticle concentration was done on Nusselt number and to find the heat exchange characteristics introducing the baffles and without it. [6] Heat transfer behavior with different boundary conditions of friction factor, pumping power, pressure drop variation were found by doing a numerical investigation. [7] In a heat exchanger

the comparison between convective theoretical film coefficient & experimental film coefficient is done. Enhancing heat transfer by utilizing fins in a heat exchanger was discussed in this paper. Experimentation on triple tube heat exchanger was performed and heat transfer characteristics was found [4] [5]. The process of shot blasting was used in this experiment to increase the roughness of the internal pipe's external diameter surface causing a change in performance in a double pipe heat exchanger. [8] Effect of triple tube heat exchanger having inner threaded pipe was performed and analyzed [1]. Tube in tube heat exchanger was numerically analyzed. The effect of plain twisted tapes, semicircular tapes, were compared with the performance in heat exchangers. Applications in industry based on counter or parallel flow was determined by using various graphs. Using Solid works, experimental and computational methods double pipe heat exchanger was studied [3]. Concentric tube heat exchanger with various fins was studied [6]. Using enhancement liners double pipe heat exchangers was studied [9]. Investigation of heat transfer coefficient Using artificial neural networks was studied. [13] Cross flow heat exchanger was studied and analyzed using neural networks. Thermal characteristics of a plate fin heat exchangers was studied and based on these survey from various sources we implemented a passive form of elliptical leaf strip insertion method to find the thermal performance on a heat exchanger. The experimentation outcomes were compared based on the orientation of these elliptical leaf strips at various angles from 0 to 180 at 10 intervals. Heat transfer analysis using artificial neural networks approach was studied. [10][11][12] Heat transfer was analyzed using prediction tool on various heat exchangers. [14] The effect of generalized predictive control was studied [15] the novelty of this investigation is on the use of a statistical tool named GRNN. (Generalized Regression Neural Network) uses neural network principles giving certain known inputs and finding the outputs. A comparison of the obtained experimental values and GRNN values are made to find the percentage of error from this technique.

II. EXPERIMENTAL SET UP

Here investigation is done on a heat exchanger with inside pipe made of copper and outer one made of steel connected with various accessories as shown in the fig. 1.

Revised Manuscript Received on October 30, 2019.

* Correspondence Author

J. Bala Bhaskara Rao*, Mechanical Engineering, Sri Sivani College of Engineering, Srikakulam, India.

V. Ramachandra Raju, Mechanical Engineering, JNTU University, Kakinada, India.

© The Authors. Published by Blue Eyes Intelligence Engineering and Sciences Publication (BEIESP). This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

Implementation Of A Neural Network Tool For Evaluation Of Thermal Performance In A Heat Exchanger By Using Double Elliptical Leaf Angle Strips With Same Orientation And Same Direction



J. Bala Bhaskara Rao, V. Ramachandra Raju

Abstract: Exchange of energy in all processes generally occur in the form of heat & work. The exchange of heat is determined by the rate of heat exchange between hot and cold body or cold and hot body. To exchange this heat we need two energy stacks such as a source & sink. So, whenever heat is rejected or accepted the energy change occurs identically i.e. amount of heat rejected is equal to amount of heat gained in an ideal case but when heat transfer rate is analyzed it is different for different processes such as vaporization is an instantaneous process whereas the condensation is slower and takes much more time so, with this idea that heat transfer rate can be altered individually in different processes an idea of analyzing heat exchanger by introducing elliptic double shaped leaf strips within the double pipe heat exchanger and the rate of heat transfer and pressure drop in is planned at various orientations of angles. From these obtained results neural network tool was designed for evaluating the thermal performance named the generalized regression neural network (GRNN). In this process certain input parameters are given (temperatures, mass flow rate) and instantly predefined output parameters (heat transfer rate, pressure drop) are obtained.

Keywords: leaf strips, heat exchanger, orientation, GRNN, heat transfer, drop in pressure.

I. INTRODUCTION

Heat exchanger is an inimitable arrangement which has the capability of improving many industrial applications by enhancing the characteristics affecting its performance.^[2] Using hexagonal & semicircular fins comparison was made between shell and finned tube exchanger. The usage of corrugated twisted pipes in place of a normal pipe yields better results in tubular heat exchangers.^[1] Introduction of Turbulators in heat exchangers causes drop in fluid pressure. A study of nanoparticle concentration was done on Nusselt number and to find the heat exchange characteristics introducing the baffles and without it.^[6] Heat transfer behavior with different boundary conditions of friction factor, pumping power, pressure drop variation were

found by doing a numerical investigation.^[7] In a heat exchanger the comparison between convective theoretical film coefficient & experimental film coefficient is done.^[8] Enhancing heat transfer by utilizing fins in a heat exchanger was discussed in this paper.^[9] Experimentation on triple tube & double pipe heat exchanger was performed and heat transfer characteristics was found.^[4] The process of shot blasting was used in this experiment to increase the roughness of the internal pipe's external diameter surface causing a change in rate of heat transfer in a heat exchanger. Effect of triple tube exchanger having internal thread pipe was performed and analyzed. Tube in tube heat exchanger was numerically analyzed. The effect of plain twisted tapes, semicircular tapes, were compared with the thermal values in heat exchangers.^[5] Applications in industry based on counter or parallel flow was determined by using various graphs. Using Solid works, experimental and computational methods double pipe heat exchanger was studied.^[3] Concentric tube heat exchanger with various fins was studied. Using enhancement liners double pipe heat exchangers was studied. Investigation of heat transfer coefficient Using artificial neural networks was studied. Cross flow heat exchanger was studied and analyzed using neural networks.^[7] Thermal characteristics of a plate fin heat exchangers was studied.^[10] Based on these survey from various sources we implemented a passive form of elliptic leaf strip insertion method to find the thermal performance on a heat exchanger. The experimentation outcomes were compared based on the orientation of these elliptical leaf strips at various angles from 0 to 180 at 10 intervals. Heat transfer analysis using artificial neural networks approach was studied.^[11] Heat transfer was analyzed using prediction tool on various heat exchangers.^{[12][13]} The effect of generalized predictive control was studied.^[14] The novelty of this investigation is on the use of a statistical tool named GRNN. (Generalized Regression Neural Network) uses neural network principles giving certain known inputs and finding the outputs.^[15] A comparison of the obtained experimental values and GRNN values are made to find the percentage of error from this technique.

II. EXPERIMENTAL SET UP:

Here investigation is done on a heat exchanger with inner pipe made of copper and outer one made of steel connected with various accessories as shown in the fig.1.

Revised Manuscript Received on October 30, 2019.

* Correspondence Author

J. Bala Bhaskara Rao*, Mechanical Engineering, Sri Sivani College of Engineering, Srikakulam, India.


V. Ramachandra Raju, Mechanical Engineering, JNTU University, Kakinada, India.

© The Authors. Published by Blue Eyes Intelligence Engineering and Sciences Publication (BEIESP). This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

Retrieval Number F8925088619/2019©BEIESP
DOI: 10.35940/ijeat.F8925.088619
Journal Website: www.ijeat.org

Published By:
Blue Eyes Intelligence Engineering
& Sciences Publication

4325


PRINCIPAL
SRI SIVANI COLLEGE OF ENGINEERING
Chilakapalem Jn., SRIKAKULAM



Article

Impact of Flexible AC Transmission System Devices on Automatic Generation Control with a Metaheuristic Based Fuzzy PID Controller

Ramana Pilla ¹, Ahmad Taher Azar ^{2,3,*} and Tulasichandra Sekhar Gorripotu ^{4,*}

¹ Department of EEE, GMR Institute of Technology, Rajam, Srikakulam, Andhra Pradesh 532127, India; ramana.pilla@gmrit.edu.in or pramana.gmrit@gmail.com

² Robotics and Internet-of-Things Lab (RIOTU), Prince Sultan University, Riyadh 12435, Saudi Arabia

³ Faculty of Computers and Artificial Intelligence, Benha University, Benha 13511, Egypt

⁴ Department of EEE, Sri Sivani College of Engineering, Srikakulam, Andhra Pradesh 532410, India

* Correspondence: ahmad_t_azar@ieee.org or aazar@psu.edu.sa or ahmad.azar@fci.bu.edu.eg (A.T.A.); gtchsekhar@gmail.com or gtchsekhar@srisivani.com (T.S.G.)

Received: 19 September 2019; Accepted: 29 October 2019; Published: 2 November 2019

Abstract: The present work proposes a teaching–learning-based optimization (TLBO)-tuned fuzzy proportional-integral-derivative (PID) controller of two-area hydro-thermal generating units for automatic generation control (AGC). The proposed system takes into account the physical constraints such as transport delay (TD), generation rate constraint (GRC), and governor dead band (GDB) nonlinearities. Firstly, fuzzy PID controllers were designed for both the areas and their gains were optimized using various minimization objective function criteria. Furthermore, applications of flexible alternating current transmission system (FACTS) devices such as static synchronous series compensator (SSSC), thyristor-controlled series capacitor (TCSC), thyristor-controlled phase shifter (TCPS), and unified power flow controller (UPFC) were investigated by integrating FACTS devices in appropriate locations of the system. The simulation results revealed that the minimum objective values were attained when the UPFC was placed in the system. Lastly, robustness analysis was done to observe the capability of the proposed controller with UPFC by changing system parameters and considering random load disturbances.

Keywords: automatic generation control (AGC); flexible alternating current transmission system (FACTS) device; fuzzy PID controller; random load disturbance; teaching–learning-based optimization (TLBO)

1. Introduction

In recent years, the consumption of power increased gradually regardless of power generation. This sudden increase in load creates some imbalances in power system operation such as the frequency and tie-line power deviations. This problem can be avoided by connecting a fast-acting automatic generation control for controlling the power generation between various control areas by holding the frequency as constant [1–4]. Automatic generation control plays a vital role in large-scale interconnected electrical power units to maintain the frequency and tie-line power as close as possible to the pre-defined values. The speed governing system in the AGC helps to manage the frequency and tie-line power within pre-defined values by varying the mechanical power input to the generators. A healthy power system must supervise the load changes and system disturbances to ensure an acceptable quality of power through the preservation of voltage and frequency within acceptable boundaries [5–8].



A framework for crime data analysis using relationship among named entities

Priyanka Das¹ · Asit Kumar Das¹ · Janmenjoy Nayak² · Danilo Pelusi³Received: 12 November 2018 / Accepted: 12 March 2019
© Springer-Verlag London Ltd., part of Springer Nature 2019

Abstract

Many crime reports are available online in various blogs and Newswire. Though manual annotation of these massive reports is quite tedious for crime data analysis, it gives an overall crime scenario of all over the world. This motivates us to propose a framework for crime data analysis based on the online reports. Initially, the method extracts the crime reports and identifies named entities. The intermediate sequence of context words between every consecutive pair of named entities is termed as a crime vector that provides relationships between the entities. The feature vectors for each entity pair are generated from these crime vectors using the Word2Vec model. The paper considers three different types of named entity pairs to facilitate the major crime data analysis task, and for each type, similarity between every pair of entities is measured using respective feature vectors. For each type of named entity pair, a separate weighted graph is generated with entity pairs as vertices and similarity score between them as the weight of the corresponding edge. Then, Infomap, a graph-based clustering algorithm, is applied to obtain optimal set of clusters of entity pairs and a representative entity pair of each cluster. Each cluster is labelled by the relationship, represented by the crime vector, of its representative entity pair. In reality, all the entity pairs in a cluster may not reflect contextual similarity with their representative entity pair. So the clusters are further partitioned into subclusters based on WordNet-based path similarity measure which makes the entity pairs in each subcluster more contextually similar compared to their original cluster. These subclusters provide us various statistical crime information over the time period. The method is experimented only using the crime reports related to crime against women in India. The experimental results demonstrate the effectiveness and superiority of the method compared to others for analysing the crime data.

Keywords Crime analysis · Online news · Entity recognition · Relation extraction · Paraphrase extraction · Graph-based clustering

✉ Priyanka Das
priyanka.rs2016@cs.iiests.ac.in

Asit Kumar Das
akdas@cs.iiests.ac.in

Janmenjoy Nayak
mailforjnyak@srisivani.com


Danilo Pelusi
dpelusi@unite.it

- ¹ Department of Computer Science and Technology, Indian Institute of Engineering Science and Technology, Shibpur, Howrah 711103, India
- ² Department of Computer Science and Engineering, Sri Sivani College of Engineering, Chilakapalem, Andhra Pradesh, India
- ³ Department of Communications Sciences, University of Teramo, Teramo, Italy

1 Introduction

Internet has provided us with various information, and yet it falls short to some of our perplexing queries where we can get the answers by analysing the data sets using existing relationships between the set of pair of entities. It not only helps in gaining ideas for a particular event, but also aids in further in-depth analysis of the data sets. Of late, online newspaper reports and other databases are playing a crucial role for identification of named entities from a large corpus followed by discovering unrestricted relations among the entities. The discovery of relationships among named entities is termed as relation extraction which is an essential step for several information retrieval tasks. It mainly starts by identifying people, places,

Published online: 22 March 2019


— PRINCIPAL
SRISIVANI COLLEGE OF ENGINEERING
Chilakapalem Jn., SRILAKSHM



Differential evolution algorithm tuned tilt integral derivative controller with filter controller for automatic generation control

Rabindra Kumar Sahu¹ · G. T. Chandra Sekhar² · Sonali Priyadarshani¹

Received: 3 September 2018 / Revised: 9 January 2019 / Accepted: 15 February 2019
© Springer-Verlag GmbH Germany, part of Springer Nature 2019

Abstract

A differential evolution (DE) tuned tilt integral derivative controller with filter (TIDF) has been implemented to a multi area reheat thermal power system for automatic generation control by taking the physical constraints like generation rate constraint and governor dead band nonlinearity. Initially, dissimilar integral controllers are considered in each area and the integral controller gains have been optimized by integral of time multiplied by absolute value of error (ITAE) criterion exploiting different strategies of DE algorithm. In next step, the control parameters such as step size and crossover probability of DE for the best strategy can be chosen with multiple iterations of the algorithm systematically for variation in each control parameter and DE proposes the control parameters. Further, PI/PID/TIDF type controller schemes have been modified and their gains have been optimized by optimal DE. Furthermore, to improve the transient system response, TIDF controller coordinated unified power flow controller (UPFC) has been investigated. The simulation results reveal that the minimum ITAE value is obtained when UPFC is placed in area-5 only. Finally, sensitivity analysis has been done by changing the operating load conditions along with the time constants of system parameters, from the simulation results it has been examined that there is no need to reset the controller parameters from their nominal setting for these variations. The proposed control scheme effectiveness is also observed by considering random step load disturbance and sinusoidal load disturbance.

Keywords AGC · DE algorithm · UPFC · GDB · GRC · TIDF

1 Introduction

In modern power systems, the aim of power system control is to maintain electrical energy at stable operating condition so that uninterrupted power delivered to the customers. It can be attained by maintaining tie-line power and system frequency to their nominal levels and it refers to (AGC) [1, 2]. Stabilizing tie-line power and system frequency variations caused by sudden and random load changes are the most challenging issues in a power system operation. Stabilization of the system frequency and tie-line power oscillations

without any control unit is impractical. To nullify the effects, a control system is necessary in changing the random load and to maintain the system frequency at the constant value. Further, it leads to maintain the balance among power generation and power demand [3, 4].

2 Literature survey

Several research papers are available for maintaining tie-line power and system frequency regulation to a scheduled value. In present days, most of the researchers proposed several soft computing techniques such as for various applications such as Spotted hyena optimizer (SHO) [5–9], fuzzy linear programming [10–16] and hybrid PSO-SHO [17]. Researchers are also proposed several secondary controllers and optimization techniques for AGC concept [18–28]. IDD controller optimized by bacterial foraging optimization algorithm (BFOA) in AGC for multi-area power system has been proposed by Saikia et al. [29],

✉ G. T. Chandra Sekhar
gtchsekhar@gmail.com

¹ Department of Electrical and Electronics Engineering, Veer Surendra Sai University of Technology (VSSUT), Burla, Odisha 768018, India

² Department of Electrical & Electronics Engineering, Sri Sivani College of Engineering, Srikakulam, Andhra Pradesh 532410, India

Aspect Based Sentiment Analysis using Naïve Bayes and Support Vector Classifiers

B Saritha¹, Janmenjoy Nayak²

¹Department of Computer Science and Engineering,

^{1,2}Sri Sivani College of Engineering, Chilakapalem Jn, Srikakulam - A.P.

mailforjnyak@gmail.com, ritha.012@gmail.com

Abstract: Sentiment analysis is extremely helpful in social media monitoring as it enables us to pick up an outline of the more extensive popular sentiment behind certain topics. People share their opinions on products and services through social media applications such as blogs, facebook, twitter and instagram etc. These online reviews provide new customers with a sense that the particular business is genuine and provides a real product or service. Sentiment analysis focuses on the opinions which may be positive or negative. In aspect based sentiment analysis, particular aspects are extracted and sentiment polarity of the aspects is determined. The proposed approach is evaluated using a reference dataset of mobile reviews collected from Amazon. In this paper, different machine learning algorithms such as Support vector machine, Naïve Bayes are considered for classification of human sentiments and parameters such as precision, recall, F-score and accuracy are used to assess the performance of a classifier.

Keywords: Opinion mining, Preprocessing, Aspect extraction, Classification

I. INTRODUCTION

Social media has become a ubiquitous part of our daily life. Social media tools provide a way to share ideas, experiences and thoughts with everyone in an effective manner. The opinions about products, restaurants or hotels events are collected and used by the organizations to know about their business [1]. Online client surveys and tributes have tremendous impact over the acquiring choices of different customers. Most people read online client evaluations or surveys before first time purchases.

In the event that a shopper has a positive involvement with an item, they will need to tell others about it to enable them for having the equivalent pleasant experience, too. Quality organizations need to give their clients the most ideal items or services. Customer feedback about the product helps to the company to provide better services in the future. People often establish their opinion about the product or services online for reviewing others or express happiness. Opinion or feedback makes up everything to betterment and flourish the overwhelming development to the core[2].

Sentiment analysis analyses people's opinions, thoughts, attitudes, emotions and sentiments entities such as organizations, individuals, products and services. Sentiment analysis is also called as opinion mining, is an approach to natural language processing (NLP) that recognizes the enthusiastic tone behind an assortment of content. This is a prominent path for associations to decide and arrange opinions about an item, services or thought. It includes the utilization of information mining, AI and machine learning to dig content for sentiment and subjective information. Sentiment analysis frameworks help associations accumulate bits of knowledge from unorganized and unstructured content that originates from online sources, e.g., messages, blog entries, bolster tickets, web visits, web based life channels, gatherings and remarks [2].

Sentiment analysis can be applied at different levels scope such as document level, sentence level and aspect level.

Design and analysis of BFOA optimised PID controller with derivative filter for frequency regulation in distributed generation system

Tulasichandra Sekhar Gorripotu*

Department of Electrical and Electronics Engineering,
Sri Sivani College of Engineering,
Chilakapalem, Srikakulam-532402,
Andhra Pradesh, India
Email: gtchsekhar@gmail.com
*Corresponding author

Darapureddi Vijaya Kumar and
Manmadha Kumar Boddepalli

Department of Electrical and Electronics Engineering,
Aditya Institute of Technology and Management,
Tekkali, Srikakulam-532201,
Andhra Pradesh, India
Email: drdvk2010@gmail.com
Email: boddmann@yahoo.co.in

Ramana Pilla

Department of Electrical and Electronics Engineering,
GMR Institute of Technology,
Rajam, Srikakulam-532127,
Andhra Pradesh, India
Email: pramana.gmrit@gmail.com

Abstract: In this article, a bacterial foraging optimisation algorithm (BFOA)-based proportional integral derivative controller with derivative filter (PIDF) is proposed for frequency regulation of multi source hybrid power system. Initially, a two area, unequal area power system with PIDF controllers, are considered. The area 1 comprises of reheat thermal power system incorporated with distributed generation (DG) system comprising of wind turbine generators (WTGs), diesel engine generators (DEGs), fuel cells (FCs), aqua-electrolyser (AE), ultra capacitor (UC) and battery energy storage system (BESS). The area 2 comprises of hydrothermal power system. The gains of the PID controller with derivative filter are optimised by using integral time multiply absolute error (ITAE) criterion. The superiority of PIDF controller is demonstrated by comparing the dynamic responses with integral derivative (ID) and proportional integral (PI) controllers. The simulation results show that the performance of dynamic responses with PIDF controller is superior to others. Further, robustness analysis is performed by varying the system parameters and wind power variations. It is observed from the simulation



PRINCIPAL
SRI SIVANI COLLEGE OF ENGINEERING
Chilakapalem Jn., SRIKAKULAM



Neural network and fuzzy system for the tuning of Gravitational Search Algorithm parameters

Danilo Pelusi^{a,*}, Raffaele Mascella^a, Luca Tallini^a, Janmenjoy Nayak^b, Bighnaraj Naik^c, Ajith Abraham^d

^a Faculty of Communications Sciences, University of Teramo, Italy

^b Department of Computer Sc. Engg., Sri Sivani College of Engineering, Srikakulam, India

^c Department of Computer Application Veer Surendra Sai University of Technology, Odisha, India

^d Machine Intelligence Research Labs (MIR Labs) Scientific Network for Innovation and Research Excellence Auburn, Washington, USA

ARTICLE INFO

Article history:

Received 12 October 2017

Revised 16 February 2018

Accepted 17 February 2018

Available online 17 February 2018

Keywords:

Computational intelligence

Fuzzy systems

Gravitational Search Algorithm

Neural networks

Search algorithms.

ABSTRACT

A good trade-off between exploration and exploitation to find optimal values in search algorithms is very hard to achieve. On the other hand, the combination of search methods may cause computational complexity increase problems. The Gravitational Search Algorithm (GSA) is a swarm optimization algorithm based on the law of gravity, where the solution search process depends on the velocity of particles. The application of intelligent techniques can improve the search performances of GSA. This paper proposes the design of a Neuro and Fuzzy Gravitational Search Algorithm (NFGSA) to achieve better results than GSA in terms of global optimum search capability and convergence speed, without increasing the computational complexity. Both the algorithms have the same computational complexity $O(nd)$, where n is the number of agents and d is the search space dimension. The main task of the designed intelligent system is to adjust a GSA parameter on a revised version of GSA. NFGSA is compared with GSA, a Plane Surface Gravitational Search Algorithm (PSGSA) and a Modified Gravitational Search Algorithm (MGSA). The results show that NFGSA improves the optimization performances of GSA and PSGSA, without adding computational costs. Moreover, the proposed algorithm is better than MGSA for a benchmark function and achieves similar results for two test functions. The analysis on the computational complexity shows that NFGSA has a better computational complexity than MGSA, because NFGSA has complexity $O(nd)$, whereas MGSA has complexity $O((nd)^2)$.

© 2018 Elsevier Ltd. All rights reserved.

1. Introduction

Solving optimization problems using exhaustive search techniques is not a practicable way. The main problem is that the search space increases hugely according to problem size. However, difficult real-world engineering problems can be solved by using algorithms inspired by nature such as Genetic Algorithms (GA) (Holland, 1992), Particle Swarm Optimization (PSO) (Clerc, 2006), Differential Evolution (DE) (Storn & Price, 1997), Central Force Optimization (CFO) (Formato, 2007; 2008). For these stochastic algorithms, the search may start either from a single point (Kirkpatrick, Gelatto, & Vecchi, 1983) or in a parallel way

with more than one initial point (Kennedy & Eberhart, 2001), (Engelbrecht, 2005).

The Gravitational Search Algorithm (GSA) (Rashedi, Nezamabadi-pour, & Saryazdi, 2009) is a swarm intelligence type algorithm based on the Newton's law of universal gravitation and motion of individuals in nature (Holliday, Resnick, & Walker, 1993; Schutz, 2003). There is a tendency for gravitational force to increase with higher masses product, therefore agents with heavier masses attract more strongly than lower masses individuals. Moreover, individuals with large masses move slowly respect to individuals with low masses. GSA is an optimization algorithm that assures a good compromise between exploration and exploitation. Exploration consists of probing a portion of the search space with the hope of finding promising solutions: the aim is to avoid getting trapped in a local optimum. Exploitation consists of probing a limited, but promising, region of the search space with the hope of improving the promising solution that comes from exploration. Therefore, in GSA, lighter

* Corresponding author.

E-mail addresses: dpelusi@unite.it (D. Pelusi), rmascella@unite.it (R. Mascella), ltallini@unite.it (L. Tallini), mailforjnyayak@gmail.com (J. Nayak), mailtobnaik@gmail.com (B. Naik), ajith.abraham@ieee.org (A. Abraham).

<https://doi.org/10.1016/j.eswa.2018.02.026>

0957-4174/© 2018 Elsevier Ltd. All rights reserved.


PRINCIPAL
SRI SIVANI COLLEGE OF ENGINEERING
Chilakapalem Jn., SRIKAKULAM

Journal of Classification 35:511-548 (2018)

DOI: 10.1007/s00357-018-9270-1

A Novel Honey-Bees Mating Optimization Approach with Higher order Neural Network for Classification

Janmenjoy Nayak

Sri Sivani College of Engineering, India

Bighnaraj Naik

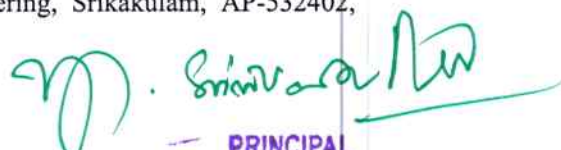
Veer Surendra Sai University of Technology, India

Abstract: In the recent past, several biological and natural phenomena have extensively attracted researchers towards the rapid development of science and engineering. Basically solving the optimization problems in various Engineering discipline is a popular topic among the other problem solving strategies. Most of the biological processes include the swarm intelligence research areas where the activity and the behavior of real insects have been studied. One of the recently developed Swarm algorithms is the Honey Bee Mating Optimization (HBMO) algorithm which is based on the mating behavior of bees. In this work, a hybrid metaheuristic honey bee mating based Pi-Sigma Neural Network (PSNN) have been proposed to successfully solve the classification problem of data mining. The proposed approach combines HBMO with the PSNN and is compared with other techniques like GA (Genetic Algorithm), DE (Differential Evolution), and PSO (Particle Swarm Optimization). Experimental results reveal that the proposed approach is steady as well as reliable and provides better classification accuracy than others.

Keywords: Honey bee mating optimization; Pi-sigma neural network; Higher order neural network; Nature inspired optimization algorithm.

Corresponding Author's Address: Janmenjoy Nayak, Department of Computer Science and Engineering, Sri Sivani College of Engineering, Srikakulam, AP-532402, India, email: mailforjnayak@gmail.com.

Published online: 1 October 2018


— PRINCIPAL
SRI SIVANI COLLEGE OF ENGINEERING
Chilakapalem Jr., SRIKAKULAM

Experimental Investigations on Wear Behavior of AA20204-Flyash-Nanostructured Redmud Hybrid Composites Synthesized by Stircasting

Anitha Santhoshi Madugula, Jntu Kakinada, Kakinada, India

B. Murali Krishna, Sri Sivani College of Engineering, Chilakapalem, India

G. Swaminaidu, Jntu Vizianagaram, Kakinada, India

ABSTRACT

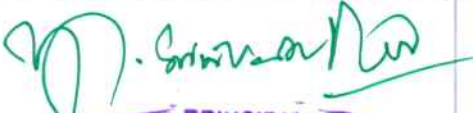
Red mud emerges as the major waste material during the production of alumina from bauxite and its potential as a filler material in metal matrices has not yet been reported. In view of this, an attempt is made to explore the possibility of making a class of wear resistant metal matrix hybrid composites with nano-structured red mud and micro sized fly ash particles as reinforcement. The micro-sized red mud particles have been modified to nano-structured red mud using high energy ball milling and after 30 hours of milling, the size was reduced from 100 microns to 30 nm. Composites were fabricated by stir casting and experiments were conducted under laboratory condition to assess the wear characteristics of AA2024- 15 wt% fly ash (micro-sized) and varying fractions (2 wt%, 4 wt% and 6 wt%) red mud (nano-structured) hybrid composites under different working conditions in pure sliding mode on a pin-on-disc machine. Tests were conducted with sliding speeds of 200 rpm, 400 rpm and 600 rpm at loads of 10N, 20N and 30N. The increased frictional thrust at higher load results in increased de-bonding and caused easy removal of material and hence the wear rate is increased with increase in normal load. The wear resistance of the composite is increased with increase in red mud fraction. This is due to the increase in surface energy and inter-atomic bonding with increase in nano-structured red mud fraction. The addition of redmud particles to the matrix phase causes dispersion strengthening and hence the strength as well. Wear resistance is increased with increase in redmud fraction.

KEYWORDS

AA 2024, Fly Ash, Ball Milling, Metal Matrix Composite, Nano Red Mud, Stir Casting, Wear Studies, X-Ray Diffraction

DOI: 10.4018/IJSEIMS.2018070102

Copyright © 2018, IGI Global. Copying or distributing in print or electronic forms without written permission of IGI Global is prohibited.


PRINCIPAL
SRI SIVANI COLLEGE OF ENGINEERING
Chilakapalem Jr., SRIKAKULAM



Feature selection generating directed rough-spanning tree for crime pattern analysis

Priyanka Das¹ · Asit Kumar Das¹ · Janmenjoy Nayak²

Received: 19 July 2018 / Accepted: 9 November 2018
© Springer-Verlag London Ltd., part of Springer Nature 2018

Abstract

Nowadays, crime is a major threat to the society that affects the normal life of human beings all over the world. It is very important to make the world free from all aspects of crime activities. The main motivation of this work is to understand various crime patterns for avoiding and preventing the crime events to occur in future and save the world from such curse. Though research is going on for solving such problems, no work is noticed to handle the roughness or ambiguity that exists in the crime reports. The present work extracts all possible crime features from the crime reports and selects only the important features required for crime pattern analysis. For this purpose, it develops a purely supervised feature selection model integrating rough set theory and graph theory (spanning tree of a directed weighted graph). The crime reports are preprocessed, and crime features are extracted to represent each report as a feature vector (i.e., a set of distinct crime features). For crime pattern analysis, the main objective of our work, all extracted features are not necessarily essential, rather a minimal subset of relevant features are sufficient. Thus, feature selection is the main contribution in the paper that not only enhances the efficiency of subsequent mining process but also increases its correctness. The rough set theory-based relative indiscernibility relation is defined to measure the similarity between two features relative to the crime type. Based on the similarity score, a weighted and directed graph has been constructed that comprises the features as nodes and the inverse of the similarity score representing the similarity of feature v to u as the weight of the corresponding edge. Then, a minimal spanning tree (termed as rough-spanning tree) is generated using Edmond/Chu–Liu algorithm from the constructed directed graph and the importance of the nodes in the spanning tree is measured using the weights of the edges and the degrees (in-degrees and out-degrees) of the nodes in the spanning tree. Finally, a feature selection algorithm has been proposed that selects the most important node and remove it from the spanning tree iteratively until the modified graph (not necessarily a tree) becomes a null graph. The selected nodes are considered as the important feature subset sufficient for crime pattern analysis. The method is evaluated using various statistical measures and compared with related state-of-the-art methods to express its effectiveness in crime pattern analysis. The Wilcoxon rank-sum test, a popular nonparametric version of the two-sample t test, is done to express that the proposed supervised model is statistically significant.

Keywords Data mining · Feature selection · Rough set theory · Relative indiscernibility relation · Minimal spanning tree · Classification · Crime pattern analysis

✉ Priyanka Das
priyanka.rs2016@cs.iiests.ac.in
Asit Kumar Das
akdas@cs.iiests.ac.in
Janmenjoy Nayak
mailforjnyak@srisivani.com

¹ Department of Computer Science and Technology, Indian Institute of Engineering Science and Technology, Shibpur, Howrah 711103, India

² Department of Computer Science and Engineering, Sri Sivani College of Engineering, Chilakapalem, Andhra Pradesh, India



Research Paper

Tumble flow studies using flat, flat with bowl, inclined and inclined with bowl pistons for suitability of stratified internal combustion engine

Accepted 30th August, 2018

Murali Krishna. B.^{1*} and Mallikarjuna J. M.²

¹Department of Mechanical Engineering, Sri Sivani College of Engineering, Sriakulam, AP-532402, India.

²Internal Combustion Engine Laboratory, Department of Mechanical Engineering, Indian Institute of Technology Madras, Chennai - 600036, India.

*Corresponding author. E-mail: murali2kindia@gmail.com.

ABSTRACT

This study deals with experimental investigations of in-cylinder tumble flows in internal combustion engine with four different piston shapes during cold flow using particle image velocimetry. The 2D in-cylinder tumble flow measurements and analysis were carried out at combustion space to analyze the tumble flow used, tumble ratio and average turbulent kinetic energy. It was found that tumble flow structure was strongly dependent on piston shape. At the end of the compression stroke, flat with bowl piston showed good improvement in tumble ratio and average turbulent kinetic energy as compared with the others.

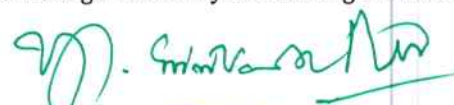
Key words: Piston, cavity, in-cylinder, velocity, tumble ratio, PIV.

INTRODUCTION

At present, modern spark ignition (SI) internal combustion (IC) engines such as stratified charged and gasoline direct injection (GDI) engines are becoming very popular because of their low fuel consumption and exhaust emissions (Arocoumanis et al., 1990). For optimization of modern engines, understanding the in-cylinder air flow behavior under different conditions and configurations of IC engine is vital. Today, an optical tool, such as Particle Image Velocimetry (PIV), is extensively used for in-cylinder flow measurements. Earlier, many experimental and computational studies have been carried out on in-cylinder flows with a limited work, generating a significant vortex flow (swirl and tumble) inside IC engine cylinder during intake stroke generates high turbulence during later stage of compression stroke (Heywood, 1988). The rotating flows can significantly increase turbulence, leading to increased thermal efficiency in premixed SI engines (Hill and Zhang, 1994). Engine in-cylinder flows using PIV reported that swirl and tumble flows should be optimized for achieving good combustion (Khalighi, 1991). Literature, clearly shows good understanding of engine in-cylinder flow structure which is very much essential for the optimization of combustion chamber.

EXPERIMENTAL SETUP

In this study, single-cylinder two-valve engine was used with speed controlled induction motor (details: power-3.7 kW, maximum speed-1500 rpm, Bore x stroke (mm)-87.5x110, Compression ratio-10:1, Maximum valve lift (mm)-7.6, Intake/exhaust port diameter (mm)-28.5, Intake valve opening (CAD bTDC)- 4.5 and closing (CAD aBDC)-35, Exhaust valve opening (CAD bBDC)- 35 and closing (CAD aTDC)- 4.5). To facilitate PIV measurements, that is, for field of view (FOV), extension of cylinder liner was made using a transparent cylinder ring with compression ratio of 10:1. Figure 1 shows photographic view of experimental setup. DAVIS (Data acquisition and visualization software) from LaVision was used for image processing (DAVIS, 2006), and ensemble average velocity vectors were computed from raw images. PIV system consists: double pulsed ND-YAG laser (200 mJ/pulse energy at 532 nm wavelength), CCD camera (2048x2048 pixels resolution, frame rate-14 per second), data acquisition system and a software, laser and camera controllers. The laser sheet was aligned with FOV; camera, triggering signals for laser and camera were generated by a crank angle encoder (Murali



PRINCIPAL
SRI SIVANI COLLEGE OF ENGINEERING
Chilakapalem Jn., SRIKAKULAM