

3.4.4 Number of books and chapters in edited volumes/books published per teacher during the last five years (5)

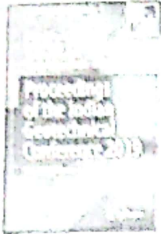
3.4.4.1: Total number of books and chapters in edited volumes / books published, and papers in national/international conference-proceedings year wise during last five years

Sl. No.	Name of the teacher	Title of the book/chapters published	Title of the paper	Title of the proceedings of the conference	Name of the conference	National / International	Year of publication	ISBN/ISSN number of the proceeding	Affiliating Institute at the time of publication	Name of the publisher
CIVIL										
1	SUJIT KUMAR PRADHAN, A Rath, G K Pothal	Lecture Notes in Civil Engineering, Springer	Evaluation of Cloth Bag and Gunny Bag as Potential Reinforcing Materials for Pond Ash.	International Conference on Construction Materials and Environment, 2021 (ICCME 2021)	ICCME-2021	INTERNATIONAL	2021	ISBN-978-981-16-6557-8 https://link.springer.com/chapter/10.1007/978-981-16-6557-8_31		Springer Nature, Singapore
2	A. K. Bhoi, S. K. Ahirwar, J. N. Mandal	Lecture Notes in Civil Engineering, vol 133.	Behaviour of Geosynthetics Clay Liner under Direct Shear Test	Proceedings of the Indian Geotechnical Conference 2019	Indian Geotechnical Conference IGC 2019, 19-21 Dec SVNIT Surat	NATIONAL	2021	Print ISBN 978-981-33-6345-8 , Online ISBN 978-981-33-6346-5 https://link.springer.com/chapter/10.1007/978-981-33-6346-5_1	IGIT Sarang, IIT Bombay	Springer, Singapore
ELECTRICAL										
3	Dr. Bibhu Pasad Panigrahi	Lecturer notes in Networks and Systems	A Comparative Analysis of Fuzzy Logic-Based DTC and ST-DTC Using Three-Level Inverter for Torque Ripple Reduction	Intelligent Systems: Proceedings of ICMIB 2020	ICMIB	International	2021	ISBN-978-981-33-6081-5 https://link.springer.com/chapter/10.1007/978-981-33-6081-5_32		Springer, Singapore
4	Umakanta Mahanta, Bhabesh Chandra Mohanta, Bibhu Prasad Panigrahi, Anup Kumar Panda	Intelligent Systems	A Comparative Analysis of Fuzzy Logic-Based DTC and ST-DTC Using Three-Level Inverter for Torque Ripple Reduction	Lecture Notes in Networks and Systems	ICMIB, 2021	International	2021	ISBN-978-981-33-6081-5 https://link.springer.com/chapter/10.1007/978-981-33-6081-5_32	IGIT, SARANG	Springer, Singapore
5	Subrat Kumar Pradhan		Inter-Area Oscillation Damping Considering Time-Varying Communication Delay of Wide-Area Power System	Intelligent Robotics and Industrial Automation (IRIA)	2021 International Symposium of Asian Control Association on Intelligent Robotics and Industrial	International	2021	ISBN-978-1-6654-3323-5 https://ieeexplore.ieee.org/abstract/document/9588732	National Institute of Technology, Nagaland	IEEE
6	Sasmita Jena		Generating Power through Numerous Interconnection of Solar PV Modules with Incorporation of Thermoelectric Generator and	2021 International Conference in Advances in Power, Signal, and Information Technology (APSIT).	APSIT 2021	International	2021	ISBN-978-1-6654-2506-3 https://ieeexplore.ieee.org/document/9641300	Siksha O Anusandhan Deemed to be University	IEEE
MECHANICAL										
7	P R Dhal	Intelligent systems	Global path optimization of Humanoid NAO in static environment using Prim's Algorithm	Lecture notes in Networks and Systems	ICMIB 2020	International	2021	ISBN 978-981-336-080-8 https://link.springer.com/chapter/10.1007/978-981-33-6081-5_3	IGIT Sarang	springer


8	P R Dhal	Intelligent systems	An emperical study of Green Supply Chain Management by using an optimization tool: An Eastern India Prospective	Lecture notes in Networks and Systems	ICMIB 2020	International	2021	ISBN 978-981-336-080-8 https://link.springer.com/chapter/10.1007/978-981-33-6081-5_39	IGIT Sarang	springer
9	R K Patel	Current Advances in Mechanical Engineering	Free Vibration Analysis of Laminated Composite Tapered Beam	Lecture Notes in Mechanical Engineering	ICRAMERD 2020	International	2021	ISBN 978-981-334-795-3 https://link.springer.com/chapter/10.1007/978-981-33-4795-3_9	IGIT Sarang	springer
10	G K Ghosh	Advances in Metrology and Measurement of Engineering Surfaces	Performance Evaluation of Graphene-Gear Oil Nanolubricants in Rayleigh Step Bearing	Lecture Notes in Mechanical Engineering	ICFMMP 2019	International	2021	ISBN 978-981-15-5150-5 https://link.springer.com/chapter/10.1007/978-981-15-5151-2_11	IGIT Sarang	springer
11	Krishna Chandra Patra, Rabi Narayan Sethi and Dhiren Kumar Behera	Intelligent systems	Benchmark of Unsupervised Machine Learning Algorithms for condition monitoring	Lecture notes in Networks and Systems	ICMIB 2020	International	2021	ISBN 978-981-336-080-8 https://link.springer.com/chapter/10.1007/978-981-33-6081-5_17	IGIT Sarang	springer
12	Mr. P.R.Dhal	Intelligent systems	Global path optimization of Humanoid NAO in static environment using Prim's Algorithm	Lecture notes in Networks and Systems	ICMIB 2020	International	2021	ISBN 978-981-336-080-8 https://link.springer.com/chapter/10.1007/978-981-33-6081-5_3	IGIT Sarang	springer
13	Mr. P.R.Dhal	Intelligent systems	An emperical study of Green Supply Chain Management by using an optimization tool: An Eastern India Prospective	Lecture notes in Networks and Systems	ICMIB 2020	International	2021	ISBN 978-981-336-080-8 https://link.springer.com/chapter/10.1007/978-981-33-4795-3_52	IGIT Sarang	springer
14	Mr. P.R.Dhal	Current Advances in Mechanical Engineering	Probability Plot Result Comparison with Recurrent Neural Network Approach for Path Navigation of a Humanoid in Complex Terrain	Lecture notes in Mechanical Engineering	ICRAMERD 2020	International	2021	ISBN 978-981-334-794-6 https://link.springer.com/chapter/10.1007/978-981-33-4795-3_52	IGIT Sarang	springer
15	Mr. P.R.Dhal	Current Advances in Mechanical Engineering	Navigational Control and Path Optimization of Mobile Robot Using Updated Sine-Cosine Algorithm in Obscure Environment	Lecture notes in Mechanical Engineering	ICRAMERD 2020	International	2021	ISBN 978-981-334-794-6 https://link.springer.com/chapter/10.1007/978-981-33-4795-3_92	IGIT Sarang	springer
16	Mr. P.R.Dhal	Current Advances in Mechanical Engineering	Safe Navigation of Humanoid Robot in Cluttered Terrain using Ant Lion Optimizer tuned RA Approach	Lecture notes in Mechanical Engineering	ICRAMERD 2020	International	2021	ISBN 978-981-334-794-6	IGIT Sarang	springer

17	Mr. P.R.Dhal	Intelligent systems	Empirical Study of Green Supply Chain Management by Using an Optimisation Tool: An Eastern India Perspective	Lecture notes in Networks and Systems	ICMIB 2020	International	2021	ISBN 978-981-336-080-8 https://link.springer.com/chapter/10.1007/978-981-33-6081-5_39	IGIT Sarang	springer
18	Mr. M.K.Muni	Current Advances in Mechanical Engineering	Probability Plot Result Comparison with Recurrent Neural Network Approach for Path Navigation of a Humanoid in Complex Terrain.	Lecture notes in Mechanical Engineering	ICRAMERD 2020	International	2021	ISBN 978-981-334-794-6 https://link.springer.com/chapter/10.1007/978-981-33-4795-3_52	IGIT Sarang	springer
19	Mr. M.K.Muni	Current Advances in Mechanical Engineering	Navigational Control and Path Optimization of Mobile Robot Using Updated Sine-Cosine Algorithm in Obscure Environment.	Lecture notes in Mechanical Engineering	ICRAMERD 2020	International	2021	ISBN 978-981-334-794-6 https://link.springer.com/chapter/10.1007/978-981-33-4795-3_91	IGIT Sarang	springer
20	Mr. M.K.Muni	Current Advances in Mechanical Engineering	Safe Navigation of Humanoid Robot in Cluttered Terrain using Ant Lion Optimizer tuned RA Approach.	Lecture notes in Mechanical Engineering	ICRAMERD 2020	International	2021	ISBN 978-981-334-794-6 https://link.springer.com/chapter/10.1007/978-981-33-4795-3_92	IGIT Sarang	springer
21	Mr. M.K.Muni	Intelligent systems	Global Path Optimization of Humanoid NAO in Static Environment using Prim's Algorithm.	Lecture notes in Networks and Systems	ICMIB 2020	International	2021	ISBN 978-981-336-080-8 https://link.springer.com/chapter/10.1007/978-981-33-6081-5_3	IGIT Sarang	springer
22	Dr. D.K.Behera	Algorithms for Intelligent Systems	Packing Density of a Tori-Connected Flattened Butterfly Network	Advances in Machine Learning and Computational Intelligence	ICMLCI 2019	International	2021	978-981-15-5243-4 https://link.springer.com/chapter/10.1007/978-981-15-5243-4_40	IGIT Sarang	springer
23	Dr. J. Nayak	Materialstoday Proceedings	Design and fabrication of a solar portable refrigerator			International	2021	https://www.sciencedirect.com/science/article/abs/pii/S2214785320363148	IGIT Sarang	Elsevier
24	Dr. R.N.Sethi	Lecture Notes in Networks and Systems	Benchmark of Unsupervised Machine Learning Algorithms for Condition Monitoring	Intelligent Systems	ICMIB 2020	International	2021	978-981-33-6081-5 https://link.springer.com/chapter/10.1007/978-981-33-6081-5_17	IGIT Sarang	Springer
25	Dr. R.N.Sethi	Lecture Notes in Mechanical Engineering	Fabrication and Characterisation of Aluminium Matrix Composite (Al 2024) Reinforced with Zircon Sand and Flyash	Advances in Production and Industrial Engineering	ICETMIE 2019	International	2021	978-981-15-5519-0 https://link.springer.com/chapter/10.1007/978-981-15-5519-0_20	IGIT Sarang	Springer

34	Dr.(Mrs)Urmila Bhanja	: Lecture Notes in Electrical Engineering ((LNEE,volume 771))	Design & Performance analysis of an encrypted Two Dimensional Coding Technique for Optical CDMA		Optical Wireless Technology, 2020	International	2021	https://link.springer.com/chapter/10.1007/978-981-16-2818-4_61	IGIT Sarang	Springer
35	Dr.(Mrs)Urmila Bhanja		An Attack Resistance Model for Trustworthiness Evaluation in VANET		2020 IEEE 17th India Council International Conference (INDICON)	International	2021	Print ISBN978-981-16-2817-7 https://ieeexplore.ieee.org/document/9342302	IGIT Sarang	IEEE
36	Dr.(Mrs)Urmila Bhanja	Advances in Intelligent Systems and Computing	. Impact of Presence of Obstacles in Terrain on Performance of Some Reactive Protocols in MANET			International	2021	Print ISBN 978-981-33-4858-5 https://link.springer.com/chapter/10.1007/9		Springer
37	Dr.(Mrs)Urmila Bhanja	AI in Manufacturing and Green Technology	Effect of Adaptive Depth-First Sphere Decoding Scheme to MIMO-OFDM System in FSO				2020	eBook ISBN9781003032465		
38	Chinmayee Panda	AI in Manufacturing and Green Technology					2020	eBook ISBN9781003032465		
39	Dr.(Mrs)Urmila Bhanja		QPSK subcarrier index modulated FSO system		IEEE ISES 2020	International	2021	Electronic ISBN:978-1-7281-8586-6	IGIT Sarang	IEEE
40	Dr. Ashima Rout	Intelligent Systems	Mental Stress Detection using GSR Sensor Data with Filtering Methods		ICMIB-2021	INTERNATIONAL	2021	Print ISBN978-981-19-0900-9 https://link.springer.com/chapter/10.1007/978-981-19-0901-6_47	IGIT Sarang	Springer
CSE										
41	Ramesh K. SahooSrinivas Sethi, Siba K. Udgate	Lecturer notes in Networks and Systems	A Smartphone App Based Model for Classification of Users and Reviews (A Case Study for Tourism Application)			International	2021	Print ISBN 978-981-33-6080-8 https://link.springer.com/chapter/10.1007/978-981-33-6081-5_30		Springer
42	Umakanta Samantsinghar; Srinivas Sethi; Dhruva Ch. Panda; Ramesh K. Sahoo	2020 IEEE International Symposium on Sustainable Energy, Signal Processing and Cyber Security (iSSSC)	Analysis on Trustworthiness of Secondary Users using Machine Learning Approaches in Cognitive Radio Network Environment.	IEEE Conference	Isssc	National	2021	Electronic ISBN:978-1-7281-8880-5 https://ieeexplore.ieee.org/abstract/document/9358906		IEEE
43	Ashima Rout, Ramesh K. Sahoo, Sangita Pal & Divyajyoti Dehury	Lecture Notes in Networks and Systems	Cognitive Function of Human Memory Using Machine Learning			International	2021	Print ISBN978-981-33-6080-8 https://link.springer.com/chapter/10.1007/978-981-33-6081-5_36		Springer

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Behaviour of Geosynthetics Clay Liner Under Direct Shear Test

[Aditya Kumar Bhoi](#) , [Sunil Kumar Ahirwar](#) & [Jnanendra Nath Mandal](#)

Conference paper | [First Online: 30 April 2021](#)

324 Accesses

Part of the [Lecture Notes in Civil Engineering](#) book series (LNCE, volume 133)

Abstract

Geosynthetics clay liner system is a key component of the engineered landfill. Both the internal and interface strengths of geosynthetics clay liner are very important for evaluating landfill stability. This paper presents a study on interface shear strength behaviour between geosynthetics clay liner and sand, and geosynthetics clay liner and Powai soil making use of a direct shear test. The experiments were carried out using dry state and submerged



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Sediment Rating Curve and Sediment Concentration Estimation for Mahanadi River

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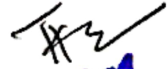
Conference paper | [First Online: 20 April 2021](#)

319 Accesses

Part of the [Lecture Notes in Networks and Systems](#) book series (LNNS, volume 185)

Abstract

The sediment rating curve for Mahanadi River is rare to produce, so the sediment rating curve for three tributaries of size medium to large of the Mahanadi River is estimated. The various curves fitting technique has been applied to estimate the sediment rating curve. It is observed that the dataset does not show log-normal distribution due to the biased sampling of data so log-transferred linear fit cannot be applied to this rating curve. The Levenberg–Marquardt nonlinear and linear algorithm is applied to find out the coefficient of


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Dynamic Data Mining for Multidimensional Data Based On Machine Learning Algorithms

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Abstract—While existing data mining methods and machine learning algorithms need a substantial quantity of data to train, more data must be acquired before they can be used. The intricacy of the model affects the size of the file, when analyzing data, like clinical trials, is difficult or costly, data-driven learning may be inefficient or overly basic. It is important to have topic-specific subject knowledge throughout the concept-development process in biomedical research. Using current visualization techniques helps scale machine learning and visual data mining algorithms, much as it does with machine learning and visual data mining. Utilizing a new method, multidimensional data visualization is utilized to help the end consumer to better comprehend their data by incorporating machine learning and data mining. Enhancing model building efficacy via various data gathering techniques, such as variable data collection, data labeling, and data change is provided through these feedback designations. In theory, the greater array of techniques will make it possible to utilize lower sample sizes, which means it will be more relevant for larger data sets, which, if possible, may have a significant effect on certain circumstances where sample sizes are difficult to collect. The two applications involved in this experiment are both character recognition software: one to decipher characters' written content, and the other to determine the author's intended meaning (regression). In spite of this, it was shown that machine learning algorithms, with or without alternate data visualization, may provide similar results with less data.

Keywords—Multidimensional Database, Data Mining, Interactive Machine Learning, Visual Data Mining, Multi-Dimensional Visualization of data.

I. INTRODUCTION

Effective data analysis techniques are required to extract meaningful insight in the face of such an excess of medical data. Researchers have long searched for ways to make data analysis more efficient, including using techniques such as statistics and data mining [1-45]. Data mining techniques have been shown to be helpful in the detection of illness. Over the last decade, the number one killer worldwide has been heart disease. Mathematicians and statisticians are using data mining and statistical methods to help them find heart illness. Heart disease diagnosis is thoroughly investigated, and findings show that using a single data mining technique, sufficient accuracy is obtained. Data visualization is important to data mining and data analytics; however, this is not because visualization is just for these operations. Visual analytics came about as a result of the visualization transformation process being included into the analytical process. Data visualizations are capable of

"decoding" the information contained in the data, as data visualization specialists explain. A large number of major breakthroughs in the fields of bioinformatics, medicine, and engineering have appeared during the past few years, and the greatest advancements were achieved in the field of bioinformatics. Success examples like these show that effective visualization is vital in every big data project, and the necessary preparation should be taken into consideration for any big data project. Inverse: The use of automated data mining and data analytics has also seen significant growth over the last decade. Because machine learning is prevalent, deep learning has emerged as the preferred method for most of the large-scale problem of related data analysis. The incorporation of visualization and machine learning for data mining research process is basically a new and specific challenging task in big data research analysis. Computational models of nonlinear surfaces are developed using huge quantities of data and neural networks (NN) and support vector machines (SVM). Trained models may be utilized for analytical tasks, including classifications, regressions, and predictions. The great benefits that have been derived from recent advances in deep learning have given machine learning an even more critical role in the processing of large datasets. When it comes to machine learning algorithms, the ideal situation is to think of them as black boxes. Users will not have a great understanding of how or why the algorithm works, but the results will be accurate. Human-centric machine learning models are created for easy consumption by humans but are beyond comprehension and engagement for end users. One of the primary goals of interactive machine learning is to provide consumers a better understanding of and more influence over the learning process. It has many benefits to offer.

Explaining the why and how of machine learning algorithms is hard since it is hard to understand the whole of their operation. There are many layers and components involved in deep learning.

Human expertise, especially for the areas of medical, scientific, and engineering, may significantly enhance the accuracy of machine learning algorithms. Although human visual perception surpasses human algorithms, human visual perception isn't currently being used in place of human algorithms. A user feedback platform that enables users to modify and fine-tune machine learning model features and parameters is essential [46].

When learning machine learning models, a significant quantity of data is often required. For applications such as these, application-level data collection, tagging, or



Design of WSN in Real Time Application of Health Monitoring System

Srinivas Sethi (IGIT Sarang, India) and Ramesh K. Sahoo (IGIT Sarang, India)

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Media Center
Health monitoring is emerging topic in recent era for safety and healthy public life in remote place. In health monitoring system, sensor devices have major role to collect data, communication and analysis the data for real time applications, such as automation of old-age home, industry, ICU, etc. It can measure different parameters of the body through different physiological body sensors. The body sensors can be used to sense the data from the body and send to the remote system for analysis. The condition of the health of a body can be analyzed and monitor remotely by using concept of body sensors in health monitoring system through different communication media, such as WiFi, ZigBee, etc. The parameter values of body can be transmitted to remote data centre with reliability, simplicity, low power, low bandwidth and low cost, in lightweight wireless networks. This may be used in real time application like; emotion and stress analysis, psychological study, physiological study, health condition, etc.

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Chapter Preview

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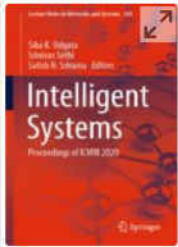
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Top

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The rapid growth in Physiological sensors, low-power integrated circuits, and wireless communication has enabled a new generation of wireless sensor networks (WSNs), can be used for monitoring the health. The body sensor network (BSN) field is an interdisciplinary area which could allow inexpensive and continuous health monitoring with real-time updates of medical records. It can be used to analyze the data in WSN environment. With recent advances in wireless body sensor networks (WBSN) and embedded computing technologies, reduced pervasive health monitoring system has become practically feasible. In addition to providing no-cost, low-power, and low-bandwidth, the newly proposed BSN includes environment aware sensing for improved sensitivity and specificity. To assist research and development in wireless body sensor networks and multi sensor data fusion, a WBSN hardware development platform is required to present. With its low power, elastic and close design, the WBSN nodes provide a multipurpose environment for wireless sensing research and development. The community can benefit greatly from learning the most salient human measures of Physiological parameters



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Direct Torque Control of Mathematically Modeled Induction Motor Drive Using PI-Type-I Fuzzy Logic Controller and Sliding Mode Controller

[Soumya Ranjan Satpathy](#) , [Soumyaranjan Pradhan](#), [Rosalin Pradhan](#), [Rajashree Sahu](#), [Aparesh Prasad Biswal](#) & [Bibhu Prasad Ganthia](#)

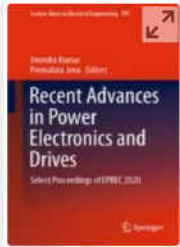
Conference paper | First Online: 20 April 2021

432 Accesses | **4** Citations

Part of the book series: [Lecture Notes in Networks and Systems](#) ((LNNS, volume 185))

Abstract

This research introduces a Type-I Fuzzy Logic control technique in associated with conventional PI controller using sliding mode control strategy for direct torque control in induction motor drive. This technique controls the rapid variation in



Recent Advances in Power Electronics and Drives pp 389–408

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Artificial Ant Colony Optimized Direct Torque Control of Mathematically Modeled Induction Motor Drive Using PI and Sliding Mode Controller

[Bibhu Prasad Ganthia](#) , [Rosalin Pradhan](#), [Rajashree Sahu](#) & [Aditya Kumar Pati](#)

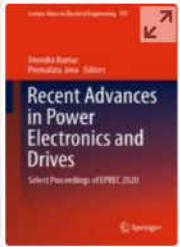
Conference paper | First Online: 04 December 2020

641 Accesses | **7** Citations

Part of the book series: [Lecture Notes in Electrical Engineering](#) ((LNEE, volume 707))

Abstract

This research introduces a meta-heuristic artificial Ant Colony Optimization (ACO) control technique to conventional PI controller that merges with the sliding mode control strategy for direct torque control in induction motor drive. This technique controls the rapid variation in motor speed to the



Recent Advances in Power Electronics and Drives pp 351–366

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Genetic Algorithm Optimized Direct Torque Control of Mathematically Modeled Induction Motor Drive Using PI and Sliding Mode Controller

[Abha Pragati](#) , [Bibhu Prasad Ganthia](#) & [Bibhu Prasad Panigrahi](#)

Conference paper | First Online: 04 December 2020

653 Accesses | **9** Citations

Part of the book series: [Lecture Notes in Electrical Engineering](#) ((LNEE, volume 707))

Abstract

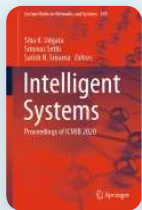
This research introduces a genetic algorithm optimization control technique to conventional PI controller that merges with the sliding mode control strategy for direct torque control in induction motor drive. This technique controls the rapid variation in motor speed to the optimum reference parameter for smooth operations. Here,

[Home](#) > [Intelligent Systems](#) > Conference paper


A Comparative Analysis of Fuzzy Logic-Based DTC and ST-DTC Using Three-Level Inverter for Torque Ripple Reduction

| Conference paper | First Online: 20 April 2021

| pp 361–372 | [Cite this conference paper](#)



Intelligent Systems

[Umakanta Mahanta](#) , [Bhabesh Chandra Mohanta](#), [Bibhu Prasad Panigrahi](#) & [Anup Kumar Panda](#)

 Part of the book series: [Lecture Notes in Networks and Systems](#) ((LNNS, volume 185))

 444 Accesses

Abstract

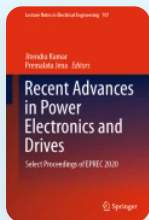
In this paper, fuzzy logic is implemented for DTC of a three-phase induction motor using two- and three-level inverter and a comparative study is done with conventional switching table-based DTC (ST-DTC). Here, d-q model in stationary reference frame equations are considered for simulation of three-phase induction motor, to which power supply is given by a three-level inverter controlled with fuzzy logic. In three-phase three-

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Genetic Algorithm Optimized Direct Torque Control of Mathematically Modeled Induction Motor Drive Using PI and Sliding Mode Controller

| Conference paper | First Online: 04 December 2020

| pp 351–366 | [Cite this conference paper](#)



Recent Advances in Power Electronics and Drives

[Abha Pragati](#) , [Bibhu Prasad Ganthia](#) & [Bibhu Prasad Panigrahi](#)

 Part of the book series: [Lecture Notes in Electrical Engineering](#) ((LNEE, volume 707))

 691 Accesses  9 Citations

Abstract

This research introduces a genetic algorithm optimization control technique to conventional PI controller that merges with the sliding mode control strategy for direct torque control in induction motor drive. This technique controls the rapid variation in motor speed to the optimum reference parameter for smooth operations. Here, genetic

Regulated Soft-Switching Power Supply Using Buck-Boost Converter

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Abstract- Among all dc-dc converters, the Buck-Boost converter is the most prominent one which plays major role in stepping up/down the input dc voltage without incorporating any intermediate ac stage. The output voltage equation mentioned in literature is based on the continuous conduction of shunt inductor/boost inductor. So this equation fails to comply when the current in the shunt inductor becomes discontinuous. So the theoretical average output voltage differs from discontinuous one at a common duty-ratio and the magnitude of deviation in voltage is again based upon the gravity of discontinuity of the inductor current. The buck-boost converter lacks in maintaining linearity of voltage with reference to duty-ratio. So in this paper, a soft-switching buck-boost converter under close-loop environment is proposed to achieve desired regulated voltage thus enhancing efficiency of the power supply equipment.

Keywords:- Buck-Boost Converter, Soft-Switching (ZCS/ ZVS), Voltage Regulation, Enhancement of efficiency.

I. INTRODUCTION

The buck-boost converter is known as a prominent dc-dc converter having action similar to ac transformer (i.e., stepping up/down input dc voltage) but without any intermediate ac stage, containing minimum number of components and compact in size, thus reduction in volume and weight. The importance of soft-switching technique and their different topologies are described[1]. Also the basic theories and analysis of various dc-dc converters (boost /buck-boost) are detailed in [1]. Y. P.Siwakotiet.al[2] has focused upon a new concept of boost converter using quasi-resonant technique. The use of soft-switching buck-boost converter is extended in field of PV cell application[3]. A good number of papers associated with boost/ buck-boost converters are reviewed [4,5] with their basic topologies, applications as well as limitations. M.Nguyenet.al[6] uses three switches for boost operation. The

design and simulation of a new soft-switching buck-boost converter is presented[7], which lacks voltage regulation. A dc-dc buck-boost converter is designed and analyzed to achieve high efficiency and low voltage gain by using a buck boost topology into buck topology[8]. The modeling, simulation of a buck boost converter is analyzed with MPPT so as to control of battery charging application [9]. A new concept using high efficiency non-isolated buck-boost converter is proposed based on ZETA Converter[10]. After all, the soft-switching buck-boost converters lack in research publications.

The average output voltage equation available in literature is put-forth based upon continuous conduction of current in boost inductor. But in reality, this equation is not applicable when there is a situation of discontinuous current in this inductor. The discontinuous current phenomena is based upon the various factors, such as duty-ratio, the switching frequency, load condition and rating of passive components (inductor/capacitor). So when the output voltage regulation is of much importance, the normal duty-ratio control under open loop will not solve the problem. Also the voltage equation differs from linearity as far as the duty-ratio is concerned. This behavioral phenomena under discontinuous current conduction is not mentioned in any of the literatures. In this paper, this reflection of average output voltage in case of discontinuous current of boost inductor has been focused critically and accordingly for voltage regulation, a regulated soft-switching power supply using buck-boost converter is presented.

II. ANALYSIS WITH PROPOSED TOPOLOGY AND MODES OF OPERATION

The basic diagram of a conventional buck-boost converter is shown in Fig.1. The output voltage equation [1] is derived by equating energy balance equation (i.e., energy absorbed by inductor during switching on with energy delivered by

Regulated Soft-Switching Power Supply Using Buck-Boost Converter

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Performance Comparison of hSGA-PS procedure with PIDA regulator in AGC of Power System

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Abstract With Proportional Integral Derivative and Acceleration (PIDA) controller, Search Group Algorithm and Pattern Search (hSGA-PS) technique overrules Automatic Generation Control (AGC) of intensity structure. A three non-linear force framework with PID regulator is thought of regulator boundaries are adjusted via Search Group Algorithm (SGA). In varied-region power structure, single zones are between related with each other zone by methods for transmission lines. Here, three districts warm gauge plans of different cutoff points with non-linearity's are considered for assessment. At that point in the subsequent stage, PID regulator is supplanted with PIDA regulator and the ideal increases of PIDA regulator are streamlined utilizing SGA procedure. Global optimizing methods like GA/PSO/FA is hybridize with local optimizing methods like PS improves the performance. PIDA controller employed for torsional resonance suppression. SGA tuned PIDA regulator upgrades introduction through and through differentiated and SGA upgraded PID regulator. Example Pattern Search, a nearby streamlining strategy utilized to adjust PIDA regulator boundaries conveyed.

1. INTRODUCTION

In varied-region power structure, single zones are between related with each other zone by methods for transmission lines. Along these lines is exertion structure of PIDA regulator AGC upgraded by hSGA-PS procedure. Pattern Search is used to improve the inevitable outcome of SGA tuned PIDA regards [1]. In this 3 district warm

superiority of PIDA controller in AVR system has been demonstrated [12].

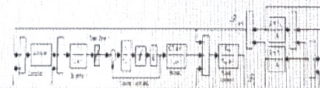
II. MATERIALS AND STRATEGY

A. Framework researched

A three region test structure is viewed as which contains three warm units of various limits of every zone in Fig. 1. Most ordinarily indicated estimation of GRC in warm unit is around 3% every moment. Lead representative dead band is a physical requirement comes about because of mechanical grating and backfire and because of error of valves in water driven hand-off [13]. The GDB influences, elements of force framework causing increment in undershoot or overshoot consistent law obvious pace guideline.

B. Regulator Structure

In Fig. 2, structure of proposed PIDA regulator is appeared, where K_P , K_I , K_D are the conventional gains of regulator and Gain of Acceleration is K_A .



A Hybrid Search Group Algorithm and Pattern Search Optimized PIDA Controller for Automatic Generation Control of Interconnected Power System



Smrutiranjana Nayak, Sanjeeb Kar, and Subhansu Sekhar Dash

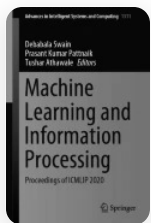
Abstract A hybrid Search Group Algorithm (SGA) and Pattern Search (hSGA-PS) technique with the PIDA controller, to deal with Automatic Generation Control (AGC) of power system is presented. In the first stage, three nonlinear power systems with PID controller is considered and the controller parameters are tuned by SGA. The supremacy of the SGA-tuned PID-controlled AGC system is demonstrated by comparing the published Firefly Algorithm (FA) optimization procedure for the same interconnected power system. Then in the second stage, the PID controller is replaced with Proportional-Integral-Derivative and Acceleration (PIDA) controller and the optimum gains of the PIDA controller are optimized employing the SGA technique. It has been demonstrated that SGA-tuned PIDA controller improves the performance significantly compared with the SGA-tuned PID controller. Pattern Search (PS), a local optimization method is used in the third stage to fine-tune the PIDA controller parameters delivered by the SGA. The advantage of the hSGA-PS-tuned PIDA controller over the SGA-tuned PIDA controller, SGA-tuned PID controller, FA-tuned PID controller is demonstrated. Furthermore, in the sensitivity analysis, the system parameters, operation load conditions, and the location of disturbance are changed and the results are analyzed. The performance and results from the sensitivity analysis reveal the effectiveness of the hSGA-PS-tuned PIDA controller

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Impact of Presence of Obstacles in Terrain on Performance of Some Reactive Protocols in MANET

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[Banoj Kumar Panda](#), [Prasant Kumar Pattnaik](#)  & [Urmila Bhanja](#)

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Abstract

In current era due to the fast growth in telecommunication technologies, there is a drastic expansion in the number of subscribers using communication network. In mobile ad hoc network, mobility of nodes and obstacles present in terrain affect a lot the efficiency of the mobile network. When there is change in mobility and presence of obstacles in terrain, link between neighbour nodes breaks very often as a result of which the network performance degrades. Many authors have investigated the performance degradation of network due to the change in mobility taking various reactive protocols but they have considered presence of obstacles. This paper gives a thorough investigation of the performance degradation due to the variation in mobility of nodes in presence of irregular-sized obstacles in terrain at different traffic conditions. The performance of two popular reactive routing protocols AODV and DSR is compared on basis of different network parameters.

QPSK-Subcarrier Intensity modulated FSO System

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Abstract—The effect of Subcarrier intensity modulation with QPSK is discussed in this paper. QPSK is chosen as the best modulation scheme among BPSK, OOK and PSK. This work simulates PSK-SIM, BPSK-SIM and QPSK-SIM applied to FSO system at spectral efficiency (SE) of 4bps/HZ and the analysis is performed in weak and strong turbulence conditions. The investigation shows that QPSK-SIM-FSO system shows BER of the order of 10^{-8} as compared to PSK and BPSK-SIM-FSO system in different turbulence conditions.

Keywords—SIM, QPSK, FSO

I. INTRODUCTION

In different modulation techniques such as phase shift keying (PSK), binary phase shift keying (BPSK), and on off keying (OOK), constant number of information chunks are mapped into signal constellation symbols [1]. For long distance communication, various modulation techniques are applied and the system performance is improved [2]. In Free space optical communication, the transmitter section includes optical sources LED, or Laser, which generate the optical signal and the receiver has a PIN or an avalanche photo detector (APD) that receive the optical signal and converts it to electrical domain [3]. In free space optical communication (FSO), atmospheric conditions and atmospheric turbulences are the cause of signal loss, which degrades the system performance [4]. In [5], authors have analysed and evaluated an FSO system to estimate the system performance under various atmospheric conditions such as foggy, cloudy, and rainy conditions [5]. Subcarrier intensity modulated (SIM) - OOK in FSO is reported to minimize the error rate and increase the throughput as reported by authors in [6]. Various turbulence conditions are considered to analyse the bit error rate in free space [6]. The classification of atmospheric turbulence based on the fluctuations of refractive index and categorized as strong, moderate and weak turbulences. For strong turbulence condition the range of refractive index structure is taken as $10^{-13} \text{ m}^{-2/3}$ or more and for weak turbulence condition the range is considered as $10^{-17} \text{ m}^{-2/3}$ or less [7]. Authors in [8] have carried out experimental analysis on MIMO in FSO under Gamma-Gamma channel model for weak to strong turbulence conditions.

The main contribution of this paper is mentioned as below.

1. The performance of an FSO system is investigated for a QPSK modulated SIM under different atmospheric turbulence conditions.

The paper is arranged as follows. Section II describes the quadrature phase shift keying (QPSK) modulated SIM for an FSO system, Section III discusses the bit error rate (BER) of

QPSK modulated SIM. The simulation and result of the experiment is described in section IV and section V summarizes the paper.

II. QPSK-MODULATED SIM

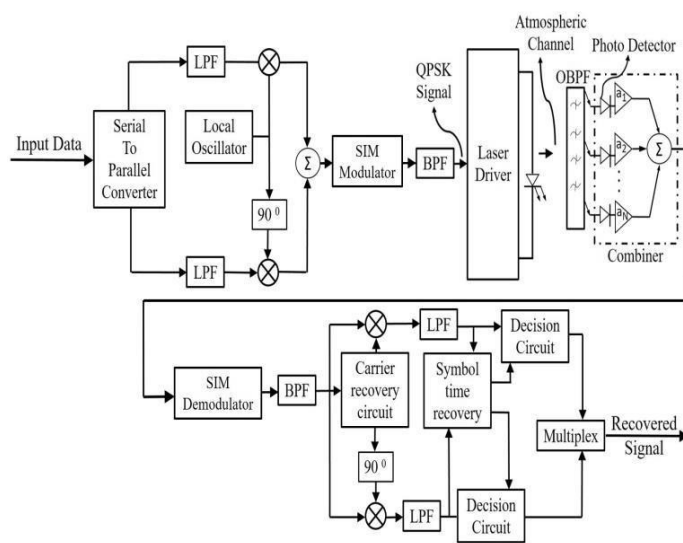


Fig. 1. Schematic diagram of the proposed QPSK modulated SIM for an FSO system

Fig 1. represents the schematic diagram of QPSK modulated SIM in FSO. The transmitter section includes the QPSK modulator where, the blocks of serial to parallel converter, low pass filter, local oscillator are included. The QPSK modulated data is transmitted to the free space through the SIM modulator and Laser driver. Receiver side consists of photo detector that converts the optical signal to electrical domain, Optical Band Pass Filter (OBPF) to receive the original band of optical signal and to limit the back-ground radiation noise detected by the photo detector. The received signal is demodulated by the SIM demodulator followed by the QPSK de-modulator used at the receiver side for recovering the original signal. The QPSK demodulator consists of carrier recovery circuit, symbol recovery time, decision circuit, multiplexer unit. Finally the signal is recovered at the receiver and the bit error rate (BER) is calculated.

The photo current at the receiver for an intensity modulated and direct detection scheme is expressed in equation (1) [9].

$$I_p(t) = RI(1 + \zeta \cdot I_B(t)) + n(t) \quad (1)$$

Where, R indicates the photo detector responsivity, I denotes the QPSK current, ζ is taken as modulation index, $I_B(t)$ denotes the baseband signal and $n(t)$ indicates the noise

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Security in vehicular adhoc network (VANET) is a challenging issue. Eavesdropper or attacker breaches security of VANET often due to the dynamicity of vehicular adhoc network with random arrivals and departures of vehicles. In addition, the wireless media also makes VANET vulnerable to an attack [1]. In this paper, a novel dual authentication (DA) algorithm is proposed to counteract few different attacks such as denial of service, sybil attack, replay attack, eavesdropping, and masquerade attack. It is found from the results that the proposed technique is robust against different types of VANET attacks such as sybil attack, replay attack, denial of service, masquerade attack, message suppression attack, and dual authentication failure. Furthermore, a novel trustworthiness evaluation scheme is designed for estimating trustworthiness of each vehicle in VANET. DA algorithm is implemented in JAVA and trustworthiness evaluation is implemented in PHP at the server.

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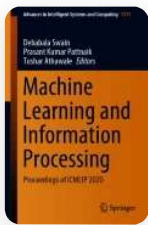


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Chapter



Effect of Adaptive Depth-First Sphere Decoding Scheme to MIMO-OFDM System in FSO

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Chinmaeyee Panda

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


Effect of Adaptive Depth-First Sphere Decoding Scheme to MIMO-OFDM System in FSO

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ABSTRACT

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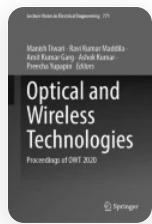


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Effect of Code and Frequency Index Modulation in MIMO-OFDM-FSO System

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Abstract

This paper analyses the MIMO-OFDM-FSO system using code and frequency index modulation. In this scheme, a joint code and frequency index modulation (CFIM) is used that enhances spectral and energy efficiencies. In weak turbulence condition for a particular spectral efficiency value, a comparative analysis is done by taking conventional OFDM, CFIM scheme with OFDM and MIMO-OFDM system in free space. The CFIM-MIMO-FSO scheme exhibits the lowest BER as compared to conventional OFDM and CFIM-OFDM scheme. Additionally, the PAPR reduction is observed by using CFIM-MIMO-OFDM-FSO scheme in free space.

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Trajectory Optimization of Wheeled Mobile Robot (WMR) in the Wall-type Arena

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Abstract. Over the last few decades, navigational motion synthesis in cluttered arena has remained as one of the most challenging area of investigation. In this paper, a smart neural network (SNN) based navigation control architecture for a wheeled mobile robot (WMR) has been presented. Here, two responsive activities are considered as the input function of the SNN controller. The obstacle position and obstacle angle with reference to the target location are two activities followed by the WMR during the trajectory planning in an environment. The outputs for the controller are wheel velocity and steering angle followed by target direction. To minimize the errors of the weight function, the backpropagation training architecture has been analyzed. It has been observed that, the robot generates a quick reaction time by using the SNN methodologies as compared to other methodologies. To evaluate the effectiveness of the developed controller, the proposed architecture has been tested in both simulation and experimental platforms keeping common environmental conditions such as position of source, target and obstacles. The results obtained from both of the platforms have been compared in terms of selected navigational parameters and the deviation obtained is found to be within 8%. The V-Rep simulation software has been used for the simulation experiments and Khepera 3 mobile robot has been used for real time experiments.

INTRODUCTION

In the last decade, various investigations have been carried out to design a robust control technique for navigational analysis of mobile robots. The primary objective of a mobile robot navigational system can be identified as a robust system that can execute motion control in rough and complex terrains with generation of collision-free smooth and optimal trajectory. To do so, artificial intelligent (AI) techniques are integrated with mobile robots to negotiate with unforeseen arena conditions and execute smooth navigation. Some of the works reported on mobile robot navigational systems can be discussed over here.

A neural network based navigational control architecture for a nonholonomic [1] mobile robot has been presented by Fierro et al. [2]. Using Lyapunov concept, a combination of torque control law and kinematic concept developed by back-stepping and presented. An artificial neural network based multisensory system integration as navigational tools has been presented by [3]. To find out best feasible solution to a real-time vehicle positional analysis, an inertial navigational system with GPS has been integrated with a Kalman filter. The concept of a dismissible gap (AG) formulation has been proposed by Mujahed et al. [4] for reaction based collision avoidance [5]. The proposed AG methodology has been found to be effective in providing kinematic solution and direct contours to the mobile robot. Gualda et al. [6] have used several ultrasonic local positioning systems for simultaneous calibration and navigation. To estimate the local and global trajectories for the mobile robot, map estimation has been performed by the proposed technique. RFID technology integrated petri-net (PN) dynamic model has been introduced as one of the potential navigational systems for a mobile robot [7]. A garbage pick-up robotic system has been designed by Bai et al. [8] using deep learning neural network approach. Kunje et al. [9] have surveyed on long-term robot autonomy with the help of artificial intelligence. They have also discussed regarding application of robotics in the areas like air and road services, marine technology, space and industrial

Global Path Optimization of Humanoid NAO in Static Environment Using Prim's Algorithm



Manoj Kumar Muni, Dayal R. Parhi, Priyadarshi Biplab Kumar,
Chinmaya Sahu, Prasant Ranjan Dhal, and Saroj Kumar

Abstract This paper focuses on navigation of a humanoid robot cluttered with obstacles, avoiding collisions in static environment using Prim's algorithm. Prim's algorithm is a minimum spanning tree (MST) method with greedy approach which uses the concept of sets. It generates the MST by selecting least weights from the weighted graph and randomly forms disjoint sets with picking one least weight edge from the ones remaining for creating node incident to form the tree. Similar approach repeats for selecting all ' $n - 1$ ' edges to the tree which is the path direction to humanoid NAO. The developed algorithm is implemented in both simulation and experimental platforms to obtain the navigational results. The simulation and experimental navigational results confirm the efficiency of the path planning strategy as the percentage of deviations of navigational parameters is below 6%.

Keywords Humanoid NAO · Prim's algorithm · V-REP · Simulation · Experiment · Probability plot

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Probability Plot Result Comparison with Recurrent Neural Network Approach for Path Navigation of a Humanoid in Complex Terrain



Manoj Kumar Muni, Dayal R. Parhi, Priyadarshi Biplab Kumar, Prasant Ranjan Dhal, Saroj Kumar, Chinmaya Sahu, and Abhishek Kumar Kashyap

Abstract This research work utilizes the concept of recurrent strategy of neurons, which performs sequential tasks where the output and input data are dependent with each other. The major advantage of using recurrent neural network (RNN) for humanoid motion planning lies in spending the previous used long sequence information through memory. RNNs form direct cycles having internal state and form prime candidate for handling learning procedure. In this paper, long short-term memory (LSTM) RNN is implemented in humanoid robot to test the motion planning analysis. In the neural network model, the obstacle distances from robot's location are fed as input parameters, and moving angle (MA) is obtained as the output parameter

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Navigational Control and Path Optimization of Mobile Robot Using Updated Sine–Cosine Algorithm in Obscure Environment



Saroj Kumar, Dayal R. Parhi, Abhishek Kumar Kashyap, Manoj Kumar Muni, and Prasant Ranjan Dhal

Abstract The metaheuristic optimization technique, updated sine–cosine algorithm (USCA), is basically based on the mathematical explanation of sine and cosine functions. It is applied on navigational control of mobile robot to optimize the path. The application of USCA is validated with V-Rep simulation and laboratory experiments with Khepera-III robot in an unknown environment. Robot effectively achieved the specified target without any collision. The comparative result tables show a difference in each run of robot under 5% which is considerable range of deviation in results.

Keywords Path optimization · Mobile robot · Sine–cosine · Obscure environment · Control

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Safe Navigation of Humanoid Robot in Cluttered Terrain Using Ant Lion Optimizer Tuned RA Approach



Abhishek Kumar Kashyap, Dayal R. Parhi, Saroj Kumar, Anish Pandey, Manoj Kumar Muni, and Prasanta Ranjan Dhal

Abstract Automation in the industry using robots is attracting many researchers because it increases the efficiency and quality of outputs. This article proposes the ant lion optimizer (ALO) tuned regression analysis (RA) approach to guide the humanoid robot in cluttered terrain. This approach optimizes the travel length and the computational time by taking an optimum turning angle to avoid the collision with the obstacle in the robot's path. The sensory statistics, i.e., the position of start, goal and obstacles, are fed into ALO as input, which provides an initial turning angle. The output of ALO is inducted to RA along with the sensory data, which provides an optimum turning angle. The optimum turning angle is used as a controlled parameter for the humanoid robot to guide the robot to the target. The simulation in a 3D simulator is carried out, which is further validated using real-time experiments on humanoid robot NAO. The relation between the simulation and experiment shows acceptable behavior with deviation under 5%. Further, the proposed technique is validated using the comparison with the existing technique.

Keywords Ant lion optimizer · Regression analysis · WEBOT · Route outlining · Optimum turning angle

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Performance Evaluation of Graphene-Gear Oil Nanolubricants in Rayleigh Step Bearing



Gaurab Kumar Ghosh, Ankit Kotia, Niranjan Kumar, and Subrata Kumar Ghosh

Abstract In this paper, the contribution of dispersed graphene nanoparticles in graphene-gear oil nanolubricant has been analyzed. Synthesis of nanolubricant has been performed using the two-step method. The nanoparticles have been dispersed in the range of 0.03–1.8% by volume in industrial gear oil (SAE EP90). Viscosity and density of nanolubricant are measured by using Stabinger viscometer (SVM 3000, M/S Anton-Paar). Rheological properties have been experimentally tested in the temperature range of 20–80 °C, and the results have been compared with theoretically available models in open literature. The performance characteristics of nanolubricants in hydrodynamic lubrication regime have been evaluated by considering the standard Reynolds equation. For this purpose, the geometry of an infinite Rayleigh step slider bearing (one dimension) is considered with defined boundary conditions. Finite difference method (FDM) is used to obtain the solution of boundary value problem. Results confirm that the dispersion of graphene nanoparticles in gear oil enhances the performance of lubrication.

Keywords Graphene-gear oil nanolubricant · Rayleigh step bearing · Reynolds equation · FDM

Abbreviations

X	Non-dimensional pad width
l	Pad width
P	Non-dimensional pressure of the nanolubricant film
$h(x)$	Thickness of nanolubricant film
H	Non-dimensional film thickness

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Free Vibration Analysis of Laminated Composite Tapered Beam



Pradeepa Kumar Mohanty and Ritesh Kumar Patel

Abstract Laminated composite tapered beams have been implemented significantly within engineering domain, e.g. military aircraft, e.g. yokes engaged in helicopter, arms manoeuvring in robots, blades sprawling over turbines as well as helicopter, antennas signalling/towering over satellites and wing structures spreading around aeronautical structures are few. The objective of the current endeavour is to establish the aspects of natural frequencies and mode shapes concern to a laminated composite tapered beam dealing with Euler–Bernoulli beam hypothesis of various limiting criteria via ANSYS. In addition to that the outcome of limiting values, assessment among natural frequencies on behalf of arrangement like cantilever, simply supported and fixed type has also been developed. It has been experienced that the natural frequencies augmented with raise in approach of vibration. Concern to the influence of limiting values in favour of the tapered beam configuration has been examined in the current endeavour. Consequently, it has been monitored that the numbers of natural frequencies (first five) on behalf of the simply supported beam appeared as the highest (639.04 Hz), fixed beam and cantilever beam executed the 2nd position (550.72 Hz) and 3rd position (378.90 Hz) correspondingly.

Keywords FEM · Laminate composite tapered beam · Free vibration

1 Introduction

Being one of the critical configuration elements, beam executed to shift loads upon machines and structures. Composite substance has exceptional engineering attributes, namely raised power or rigidity to mass proportion and complimentary tiredness quality. It has also successfully spreading over the art of modelling of gyrotory structure in particular aircraft turbine fans, wind turbine blades and helicopter rotor blades a few. A number of occasions demand rigid at one position and must to elastic at the other site, e.g. arms of the robot, blades of a helicopter as well as one

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Effect of heat treatment on wear behaviour of Al-7 wt%Si-X wt% Mg alloys

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Abstract

Age-hardened as-cast aluminum alloys are being more and more used in the automobile industry because of their high strength, lightweight and low cost, which provide affordable improvement in fuel efficiency. In this current research, three different types of alloys are prepared by adding Mg (X = 1–5 wt%) with the Al-7 wt%Si master alloy. Prepared alloy samples were solution treated at a temperature of 535 °C for 4 h followed by water quenching. Then ageing is done at 165 °C with a span of 4 h. Wear tests were done by pin-on-disc wear testing instrument at normal load 10 N, 20 N, and 30 N, with varying sliding speed 200, 300, 400 rpm respectively for 5 min. Variation of wear with the applied load and sliding speed was studied from the experiment. It is noticed that decreases hardness value with the increasing content of Mg in Al-7 wt%Si+ (1–5 wt%) Mg alloy. Higher wear found with increasing normal load and sliding speed. Highest wear resistance (sliding wear) is seen in the Al-7 wt%Si-1 wt%Mg alloy sample. So heat treatment process improved the wear resistance. The worn surfaces are exhibited through a scanning electron microscope (SEM) in order to check the



Effect of pouring temperature on microstructure and mechanical properties in Al-16Si-2%Al₂O₃ hypereutectic alloys

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Abstract

The Al-Si hypereutectic alloys are taking vital role in day to day life and industrial applications for its excellent microstructural and mechanical properties. The grain size, volume fraction and distribution of both primary as well as eutectic silicon enhances significantly on these properties among the materials. The modification of primary and secondary Si particles in hypereutectic Al-Si alloys is quite difficult in conventional processes. This paper investigates the microstructural and mechanical properties changes as changing in pouring temperature. During solidification, the effect of pouring temperature on primary and secondary Si particles is showing the vital role in hypereutectic Al-16Si-2%Al₂O₃ alloy. In order to achieve better microstructure and mechanical properties, the interfacial bonding between the dispersed phase and liquid matrix was good in the synthesized composites produced by casting route over other conventional processes. The cast product of hypereutectic Al-16Si alloy shows significant variation over wear behaviour and hardness at different pouring




Effect of temperature and pressure on diffusivity of nitinol pellet bonded with steel plate

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Abstract

Nitinol is an equiatomic alloy of nickel (Ni) and titanium (Ti). Nitinol and stainless steel both are used as the bearing materials in the aerospace industry. Joints between nitinol and stainless steel have found applications in nuclear and petrochemical industries. In this work, we have tried to develop a diffusion bonding between a nitinol pellet and a mild steel plate. Nitinol, a smart material was prepared by the powder metallurgy route. Ni and Ti powder were used as the source for the preparation of nitinol samples. Diffusion bonding was created between the pellet and the plate by placing the nitinol pellet on the steel plate at different temperatures and pressure. The pressure for this experiment was 0.1 and 0.3 MPa and the temperatures were maintained at 800 °C and 900 °C. Microstructural analysis of the diffused pellet was carried out by scanning electron microscope (SEM). EDS X-ray mapping was done to get a visualization of the distribution of different elements present in the diffused pellet. X-ray diffraction (XRD) analysis was also done to get knowledge about





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Mathematical modeling for the prediction of wear rate of Al-12.6Si/TiB₂ *in situ* composites

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Abstract

In the present study, a mathematical model is proposed for the prediction of wear rate of Al-12.6Si alloy-based composites reinforced with *in situ* TiB₂ (2, 3, 5 wt%) particles by halide salt reaction route. For deducing an empirical relationship for wear rate (pin-on-disc type wear), a multiple regression analysis has been performed to show its dependency on the TiB₂ content of composite and various wear test parameters. From the regression statistics, it is inferred that the wear rate is strongly dependent on the rotating speed of the disc but moderately on the TiB₂ content and applied normal load.

Introduction



Processing and Characterization of Compression Molded Multifunctional UHMWPE-CaTiO₃ Composite

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Abstract

With increasing demand for pulse power energy storage system with high energy density has led to the development of polymer composite system that combines the processability and breakdown field strength of the polymer with the high dielectric constant of ceramic fillers. Our current research on processing polymer composites by compression molding method focuses on the enhancement of the dielectric permittivity of UHMWPE using ferroelectric metal oxides (CaTiO₃). In this view, the different UHMWPE-CaTiO₃ composite sheets were prepared by the addition of varying (5 and 10 wt%,) amount of CaTiO₃. The microstructural characterization was carried out by using XRD, while electrical characterization of composites was carried out by Impedance Analyzer. As a result, hardness (Shore D) and apparent Density value of the UHMWPE-CaTiO₃ come out to be 64 and 0.9144 g/cm³. It was also observed that with the function of frequency and temperature, the AC conductivity and dielectric constant were increased upto $3 \times 10^{-6} \text{ S.m}^{-1}$ and 2.80 respectively with addition of CaTiO₃. Activation Energy was calculated using Arrhenius Equation found to be



Processing and characterization of Fe-35Mn biodegradable metallic materials

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Abstract

Now-a-days metallic biodegradable biomaterial (MBB) has taken more attention by research people. From last few decades an enormous research has been done in magnesium, zinc and iron based MBB. Magnesium and zinc based alloys are now in final implementation stage whereas iron based alloys still in research stage. To take iron based alloys to the implement stage, a lot of research has been done by many research people for different aspects from last few decades. Among all iron based alloys, Fe-35Mn is one of them which show higher degradation rate in vitro as well as in vivo studies. In this study, effect of average particle size varies (from 30 to 80 μm) on degradation behavior and was completely investigated of the above alloy which is being prepared via powder metallurgy route. Fe-35Mn alloy pellets were sintered in a tube furnace at 1200 °C under Ar-5%H₂ atmospheric pressure. SEM and DLS particle size analysis showed that 3 h milling time was the optimum time for the milling of initial powder sample. Smaller average particle size (35 μm) was responsible for uniform corrosion of Fe-35Mn alloy. Optical microscope analysis showed uniform corrosion on the surface of the sample. XRD results were also showed anti-ferromagnetic behavior as γ-Fe phase was present after sintering. Sintered density and porosity were calculated for each sample and showed



Studies on in-situ TiB₂ reinforced Al-Si alloys synthesized by stir casting method

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Abstract

Materials with unusual and challenging combinations of properties like low density, good strength, high stiffness along with abrasion, impact and corrosion resistance, which cannot be experienced by the conventional materials are required in many of our modern technologies needed for aerospace, underwater and transportation applications. Al-Si Alloy has been proved to be an excellent material to substitute conventional engineering materials by virtue of its good castability, corrosion resistance and specific strength. Nevertheless, in-situ TiB₂ reinforcement adds to its wear properties because of its outstanding hardness and clean interface during formation. In the present study, an effort has been made to synthesize Al-Si alloys reinforced with TiB₂ particles through salt metal reaction and to highlight the performance of these composites with respect to variation in silicon content accompanied by TiB₂ particles synthesised by stir casting method. A pin-on-disc wear testing machine has been used to investigate the dry sliding wear behaviour of these composites with varying load (10, 20, 30) N and varying speed (300, 400, 500) rpm. Microstructural characterization by Scanning Electron Microscope and optical microscope clearly explained the enhanced wear

Effect of Cold Work on Microstructure and Corrosion Properties of 304L Stainless Steel



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Abstract Type 304 stainless steels have profound application in engineering including springs, kitchen equipment, auto wheel covers, hose clamps, truck bodies, exhaust manifolds, storage tanks, piping and pressure vessels, etc. AISI 304 is rolled/deformed uniaxially to reduce the thickness to 20, 40, 60% of the initial thickness using rolling machine (notation CW00, CW20, CW40, CW60). The magnetic character of type 304 stainless steel was measured in terms of percentage martensite content using feritscope after cold rolling. It is observed that the cold work structure forms high dislocation density regions or tangles, which further develop onto tangled network; therefore, higher cold worked material has higher slip bands or planes. As the amount of percentage deformation increases, martensite formation increases, and hence, the magnetic nature increases. With increase in cold work, hardness also increases due to the formation of martensite in different systems of slip planes. Again, it is observed that corrosion test in H_2SO_4 and KSCN solution highly affects the slip planes.

Keywords 304L stainless steel · Deformation · Stacking fault energy · Cold working · Corrosion

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