



ICAPE – 18

INTERNATIONAL CONFERENCE ON ADVANCES & PRACTICES IN ELECTRICAL ENGINEERING

**Nagpur, Maharashtra
08th & 09th March, 2018**

Organized by:
**Department of Electrical Engineering
KDK College of Engineering, Nagpur**
in association with
Institute For Engineering Research and Publication
and
The Institution of Engineers (I), Nagpur Local Centre

From Director's Desk



Rudra Bhanu Satpathy.,

Director,
Institute For Engineering Research and Publication.

We are extremely glad to welcome researchers as well as scholars from academics and Industries to International Conference on "**International Conference on Advances & Practices in Electrical Engineering-18**" organized by **KDK College of Engineering, Nagpur, Maharashtra** in association with **Institute for Engineering Research and Publication (IFERP)**.

Nagpur the winter capital, a sprawling metropolis is being proposed to be one among the smart cities of India. Very often known as "Orange City" it has been the commercial and technical center of Vidarbha region of Maharashtra and 20th cleanest city in India and the top mover in the western zone as per Swachh Sarvekshan 2016 . Established in 1703 by Gonds king Bakht Buland Shah of Deogarh Nagpur has emerged as a major hub of education with four state university and well-built infrastructure for scientific advancement.

Our continuous and dedicated effort to bring scientific and academic transformation in India makes us organize world class scientific events and conferences at educational institute of our country. As Scalar waves (superpower) that travel faster than speed of Light can be generated by resonating our DNA with Pineal Gland, we believe integrated effort to organize international conference like **ICAPE** at a very short span will be a grand success. We are highly grateful to patron, convener, organizing committee and all the technical staffs of the **KDK College of Engineering** for their swift, smooth and continuous response for execution of preconference propagation. We express our hearty gratitude to all **IFERP** members for their support and contribution to organize **ICAPE** at Nagpur.

On behalf of entire team of **IFERP** I express my warm welcome to researchers, delegates and professional experts from nook and corner of India to bestow this conference by added value by their scientific presentation. With gratefulness from core of my heart I appreciate the painstaking effort of our eminent keynote speakers to compromise their valuable schedule for **ICAPE**.

I believe attending scientific events makes us update with progressing technology and academic scopes which will support in scientific studies and incubation in Western India.

Sincerely,



Rudra Bhanu Satpathy,

Preface

The “*International Conference on Advances & Practices in Electrical Engineering*” is being organized by KDK College of Engineering (KDKCE), Nagpur in association with *IFERP-Institute for Engineering Research and Publications on the 08th - 09th March’ 2018*.

KDK College of Engineering has a sprawling student –friendly campus with modern infrastructure and facilities which complements the sanctity and serenity of the Metropolis city of Nagpur in Maharashtra.

The “*International Conference on Advances & Practices in Electrical Engineering*” was a notable event which brings academia, researchers, engineers, industry experts and students together.

The purpose of this conference is to discuss applications and development in area of “**Electrical Engineering**” which were given international values by *Institute for Engineering Research and Publication (IFERP)*.

The International Conference attracted over 114 submissions. Through rigorous peer reviews 85 high quality papers were recommended by the Committee. The Conference aptly focuses on the tools and techniques for the developments on current technology.

We are indebted to the efforts of all the reviewers who undoubtedly have raised the quality of the proceedings. We are earnestly thankful to all the authors who have contributed their research works to the conference. We thank our Management for their wholehearted support and encouragement. We thank our Principal for his continuous guidance. We are also thankful for the cooperative advice from our advisory Chairs and Co-Chairs. We thank all the members of our local organizing Committee, National and International Advisory Committees.

Secretary Message



Shri Rajendra Mulak,

Hon. Secretary, KDKCE

I Congratulate Electrical Engineering Department of K.D.K. College of Engineering for holding this First *International Conference on Advances & Practices in Electrical Engineering (ICAPE 2018)* on *8th -9th March, 2018*. This is the third International Conference organized by *K.D.K. College of Engineering, Nagpur* within a span of two years and second in the same year. This is a commendable achievement on the part of the institute. I am sure that the conference will provide a platform for practising engineers, academicians and industry persons for exchange of ideas and technological developments. This will surely help in the development of budding engineers and faculty members of the college.

My Best wishes for the grand success of the conference.

(Rajendra Mulak)

Treasurer Message



Shri Yashraj Mulak,
Hon'ble Treasurer, KDKCE

I feel proud to acknowledge that K.D.K. College of Engineering, Nagpur is organizing third International Conference, Advances & Practices in Electrical Engineering (ICAPE 2018). I congratulate the organizing team of Electrical Engineering Department and hope that this conference will also deliver fruitful results by exchange of information and knowledge for the benefit of all stakeholders.

I wish all success to the conference.

(Yashraj Mulak)

Principal Message



Dr D.P. Singh
Principal, KDKCE, Nagpur

It gives me immense pleasure to announce a Two-day International Conference on Advances & Practices in Electrical Engineering (ICAPE 2018) by the Department of Electrical Engineering, K.D.K. College of Engineering, Nagpur on the 8th -9th March, 2018. The conference is jointly organized by the Institute for Engineering Research and Publication, Chennai, Institute of Engineers (I), Nagpur Local Centre and The Electrical Contractors' Association, Nagpur.

Electrical power sector is witnessing a lot of changes in generation, transmission & distribution as well as in utilization of Electrical Energy. There is appreciable penetration in the form of renewable energy in addition to conventional generation. Power grids are getting smarter. Electrical appliances need suitable modifications to adapt to renewable energy. Thus, the deliberations on all changing scenario become a need of the hour. ICAPE 2018 provides an opportunity for academicians, practising engineers, industry persons as well as energy managers to exchange their contributions and give innovative suggestions for sustainable development of energy sector.

This International Conference is bound see the experts from varying fields sharing their experiences. Professionals from overseas, premier institutions like IITs and NITs will be discussing the latest technological developments in the field of Electrical Engineering. I take this opportunity to express my gratitude to all the renowned personalities for their valuable presence. I thank all the authors and delegates for their papers and contribution towards the conference.

The papers to be presented in the conference are carefully reviewed and selected for presentations. I express my sincere thanks for the efforts taken by the reviewers. The presentations will be evaluated by eminent technical chair and co-chair and these session chairs will adjudge the best paper award in various categories. I owe my thanks to these members of the technical chairs. I am also indebted to various organizations, sponsors and individuals without their support this event would not have been possible.

I wish every success to the entire team of ICAPE 2018 for all their efforts in organizing the conference and making it a grand success. I hope that all participants will find this conference

a useful platform for presenting new ideas, results and recent advancements in the field of Electrical Engineering.

(Dr. D P Singh)

Vice Principal Message



Dr Avinash M Badar

Vice Principal, KDKCE, Nagpur

I am indeed proud and privileged to organize a Two-day International Conference on Advances & Practices in Electrical Engineering (ICAPE 2018) by the Department of Electrical Engineering, K.D.K. College of Engineering, Nagpur on the 8th -9th March, 2018. The conference is jointly organized by the Institute for Engineering Research and Publication, Chennai, Institute of Engineers (I), Nagpur Local Centre, Nagpur and The Electrical Contractors' Association, Nagpur.

I take this opportunity to brief about K.D.K. College of Engineering, Nagpur. The K.D.K. College of Engineering, Nagpur, established in 1984 by Backward Class Youth Relief Committee (BCYRC) is one of the leading engineering colleges in Maharashtra State, approved by AICTE, New Delhi and Director of Technical Education, Maharashtra and affiliated to Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur. Government of Maharashtra has conferred 'A' Grade on the basis of excellence and adequate infrastructure as well as academic achievements of students and faculty. The college runs Six Undergraduate courses, three Postgraduate courses with total intake capacity of 726 and is also a research centre. The National Board of Accreditation had accredited Electrical, Civil and Mechanical Engineering courses. The vision of the college is "Service to the Society through Quality Technical Education". The orientation of academic and administration in the college is such that the stake holders are nurtured to achieve professional competency to help build their career and society at large.

I take this opportunity to thank the Management of KDKCE for their whole-hearted support needed to organize such a mega event. I also thank the academicians, researchers and professionals whose contributions made this conference a great success.

I Congratulate Electrical Engineering Department and the organizing team of ICAPE 2018 for their excellent work and express my sincere thanks to the experts from field, keynote speakers for their valuable deliberations. I also thank the authors, delegates and participants for their valuable contributions. I also extend my thanks to IFERP, IE(I) and ECA for joining their hands in the organization of ICAPE 2018.

I wish every success to the entire team of ICAPE 2018.

(Dr. Avinash Badar)

Conference Co-chair Message



Er. Milind Pathak

Hon. Secretary, Institution of Engineers (I), Nagpur Local Centre

The Institution of Engineers (India) is the first professional body of engineers founded in India to be incorporated by Royal Charter in 1935 to promote and advance the art, science and practice of the myriad field of engineering and technology. It is today a multi-disciplinary nationwide organisation having an overall membership of over 0.75 million – the largest body of its kind in the whole Asia with international status and bilateral relations with many sister societies around the world. The Corporate membership of the Institution is open to any person with an accredited engineering degree with prescribed professional experience. IEI has presently more than 100 State/Local Centres in India. Nagpur Local Centre is one such Centre established in 1956. The growth of this Centre has been remarkable right from its inception. Many events of technological advancements like Seminars, Workshops, Expert Lectures, and Exhibitions are undertaken. The Two Days International Conference on Advances and Practices in Electrical Engineering (ICAPE 2018) by the Department of Electrical Engineering, KDK College of Engineering, Nagpur on March 8-9, 2018 at KDKCE, Nagpur will definitely bring experts in the field of Engineering at one place and deliberate on various aspects. The conference themes will surely find interest among the Electrical Engineers to dwell on their topic of interest. Eminent personalities in the field of Electrical Engineering are expected to participate in the deliberations. I am sure, this conference will benefit the industries, practicing engineers, consultants and engineers.

I take this opportunity to extend my greeting to all and wish the conference a great success.

Er. Milind Pathak

Convener Message



Dr. Shubhangi Ambekar

Professor & Head, Dept. of Electrical Engg., KDKCE, Nagpur
Convener, ICAPE 2018

The Department of Electrical Engineering, K.D.K.C.E. Nagpur and Institute for Engineering Research and Publication, Chennai in association with Institution of Engineers (I) Nagpur Local Centre and The Electrical Contractors' Association, Nagpur is jointly organizing Two-Days "International Conference on Advances and Practices in Electrical Engineering" (ICAPE 2018) on the 8th -9th March, 2018 at K.D.K.C.E., Nagpur.

Growth of a nation depends upon the availability of Energy and its transportation to nook and corner of the country. Electrical Power and Energy is one of such fundamental pillars which decides the shape of the economy of any country. The Kyoto protocol has forced all countries to change their policies and give a tremendous boost to the generation of energy from non-conventional sources in order to mitigate the problems of carbon emissions, footprints and global warming. The objective of the conference is to encourage professional interactions among various stakeholders to meet the challenges in the field of Electrical Engineering in the contemporary setup of rapid shift in generation and utilization of energy. The advent of renewable energy and its interconnection with the existing electric grid is creating revolutionary changes in the utility sector. The power grid structure is set to alter from Mega to micro levels. This situation calls for review, deliberations, propositions and exchange of new ideas among the research, education and industry experts. The aim of the conference is to provide an opportunity for exchanging recent technological developments, scientific research and breakthroughs in the field of Electrical Engineering. Engineers, Scientists, Researchers, Academicians, Energy managers and Industry experts can share their knowledge, expertise and experiences of various concepts and innovations in the present scenario.

Research Papers are invited from Academicians, Research Scholars, Scientists and Practitioners working in various domains of Electrical Engineering pertaining to following areas:

Power Generation, Transmission and Distribution
Renewable Energy Sources, Smart-grid Technologies & Applications
Power Electronics, Systems and Applications
Electrical Machines and Adjustable Speed Drives
Circuits and Systems

Control Applications
High Voltage Engineering and Insulation Technology
Technology Innovations in Electrical and Electronics Engineering

The Conference Proceedings along with CD contain the Technical papers from Electrical Engineering experts, Academicians, Research Scholars, students etc. The conference is a good opportunity for the participants coming from different places of India to present and discuss topics in their respective research areas. Various technical sessions of Two-Days ICAPE 2018 are based upon different themes and subthemes of the conference. I expect that all participants will find the deliberations in the sessions interesting and informative.

I express my heartfelt gratitude to all invited guests and keynote speakers for sparing their valuable time and gracious presence in the conference.

I take this opportunity to thank all participants for their contributions to the conference proceedings. My special thanks to all sponsors, supporters for extending their support and hospitality which created a homely atmosphere for all participants.

I owe my special thanks to my colleagues and committee members for their untiring efforts in compiling this proceeding volume. I thank the complete team of ICAPE 2018 for the pains and hard work undertaken in planning and execution of conference work to the minutest details.

I acknowledge with pleasure the support and co-operation extended by the College Management, Principal and Vice-Principal without which organization of this conference would not have been possible. My honest thanks to all of them.

I sincerely thank the office bearers of IFERP, IE(I) and ECA for associating with us in the organization of ICAPE 2018.

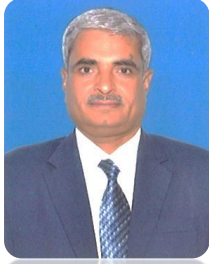
I wish a pleasant and enjoyable stay to all conference delegates on the KDKCE campus.

Dr.Shubhangi Ambekar

ICAPE - 18

***International Conference on
Advances & Practices in
Electrical Engineering***

Keynote
Speakers



Dr. V. K. Khare.,

Executive Director (Western Region – I),
Power Grid

BIOGRAPHY

Dr. V.K. Khare is B.E. in Electrical Engineering (Gold Medalist) from Jiwaji University, Gwalior. He completed MBA and conferred Ph.D from Nagpur University.

Dr. Khare started his professional career with NTPC and is currently working with POWERGRID as Executive Director (Western Region -I). He has rich experience of 35 years in Power System, having worked in Construction, Operation & Maintenance of Extra High Voltage Transmission Systems.

Dr. Khare was deputed as first CEO of Ethiopian Electric Utility to lead consortium of POWERGRID, NHPC and BRPL. Ethiopian Electric Utility with 13000 employees, is a nationwide utility responsible for Generation, Transmission and Distribution of electricity in Ethiopia as well as exports power to Kenya, Sudan and Djibouti. Dr. Khare was entrusted with the responsibility of restructuring of Ethiopian Electric Utility and was directly reporting to Deputy Prime Minister of Ethiopia. Dr. Khare also coordinated with all departments of Govt. of Ethiopia including Regional Governments. Dr. Khare was instrumental in introducing concept of Power Purchase Agreement. He was also actively involved in establishment of National Load Dispatch Centre in Addis Ababa.

Ethiopian Electric Utility achieved more than 100% target set by the Govt. of Ethiopia in 2 years during tenure of Dr. Khare as CEO of Ethiopian Electric Utility. Ministry of Water, Irrigation and Energy, Govt. of Ethiopia awarded Ethiopian Electric Utility for outstanding achievement in growth, reform and good governance. Commercial Bank of Ethiopia awarded Dr. Khare for his outstanding contributions in boosting the national foreign currency by means of export of energy.

Dr. Khare leveraged the concept of balanced score Card of financial stability, operational performance, employee development and customer eccentricity for measurement of organization performance.

As CEO of POWERGRID Nagapattam Transmission Ltd., first Tariff Based Competitive Bidding (TBCB) project is commissioned.

Dr. Khare managed Transmission System Asset of POWERGRID in Southern Region-II of POWERGRID, including back up National Transmission Asset Management Centre, Regional Transmission Asset Management Centre, Unified Load Dispatch and Communication, Enterprise Resource Planning, Smart Grid Management and Commercial function of the Region. O&M Performance of Southern Region II was adjudged best among all the regions of POWERGRID during his tenure.

Dr. Khare also presented many papers in National and International seminars in America, Europe and Asia.

Presently, Dr. Khare is Executive Director, Head of Western Region Transmission System-I (consisting states of Maharashtra, Chhattisgarh, Goa and part of MP) having 19,171 Circuit km of Transmission lines & 20 EHV substations under operation & gross asset value of 27,000 Crs. In his leadership, works in Transmission line Projects with capital cost 7000 Crs are in progress. Projects having capital cost 5000 Crs has been planned to be commissioned by Mar'18.



Dr. N. K. Kishore.,

Professor, Department of Electrical Engineering,
IIT Kharagpur.

BIOGRAPHY

N. K. Kishore received the B.E. degree in electrical engineering from Osmania University, Hyderabad, India, in 1983; the M.E. degree in Electrical Engineering (High Voltage Stream) from the Indian Institute of Science (IISc.), Bangalore, in 1985, and the Ph.D. degree in the area of Lightning Transients on Electric Power Systems from the IISc. Bangalore in 1991. Currently, he is a Full Professor of Electrical Engineering and Associate Faculty of School of Energy Science and Engineering with the Indian Institute of Technology (IIT) Kharagpur. He was a Scientific Officer(research Projects) with IISc Bangalore from 1987 to 1991 working in the area of Lightning Interaction with Telecommunication Circuits and Air crafts for Defence applications. He joined the faculty of Electrical Engineering at IIT Kharagpur, in 1991. His research interests include high-voltage engineering, power systems, lightning, EMI/EMC condition monitoring of power apparatus and renewable energy. He has supervised five Doctoral Students and three MS students apart from several M.Tech and B.Tech students. He developed course material on Illumination Engg; both in video and web formats. He has developed a Virtual ICT enabled High Voltage Laboratory. He has published about 30 papers in International and National Journals and presented about 100 papers in India and abroad. He is a Senior Member of IEEE(USA), Member of Electrostatic Society of America (ESA USA) and a Fellow of the Institution of Engineers (India). He was on the institute advisory committee of Electrical Works advising on Planning, Installation, Operation and Maintenance of reliable continuous electric power supply to IIT Kharagpur from 1997-2007. He was Professor-in-charge of the Committee from 2005-2007. He was the Convenor of NPSC 2002, Kharagpur; General Chair of IEEE Region 10 Colloquium and ICIS 2008 Kharagpur and TPC Chair of ICPS 2009, Kharagpur. He has been an active volunteer of IEEE Kharagpur Section since 2004. He was in the executive committee of the section from 2004-2010. He was the Section Chair in 2007.



Prof. Sanjay Dambhare.,

Professor, Department of Electrical Engineering.,
College of Engineering, Pune.

BIOGRAPHY

Dr. Sanjay Dambhare received a Diploma from Govt. Polytechnic, Nagpur in 1986, the B.E. degree from the Visvesvaraya National Institute of Technology (VNIT/VRCE), Nagpur, India, in 1989, the M.Tech. degree from the Indian Institute of Technology, Bombay, India, in 1998, and the Ph.D. degree also from the Indian Institute of Technology–Bombay, Mumbai, in 2009 (in the field of transmission system protection), all in electrical engineering. He started his teaching career from KDK College of Engineering, Nagpur. Currently, he is Professor in Electrical Engineering at the College of Engineering, Pune, India. He contributed as Head of Electrical Department at COEP from July 12 to Jan 16. His research interests include Smart Grid, Smart and renewable energy systems, power system protection, WAMS, numerical relays, applications of power electronics to power system (HVDC and FACTS), power system computation, transient and micro-grid. He is also working in quality improvement of engineering education. He has published around 60 research papers in International Journals and Conferences of high repute, worked as a consultant on various industrial/Govt. projects and conducted training courses for industries like Crompton Greaves, L&T. Dr. Dambhare is presently supervising 7 Ph. D. scholars and guided 55 M. Tech. thesis. He has participated in more than 85 national and international professional events including International Summer University in Germany, IEEE PES General Meetings at Canada, USA, Singapore and other countries. He is Principal Investigator of Center of Excellence in “Smart Renewable Energy System” at CoE, Pune. He has completed around 16 consultancy projects and organized 20 CEP/workshops at national and international level. He has worked on several state and central government committees of AICTE, UGC, DST, CSIR, DRDO, DTE and NBA. He is a reviewer of national and international journals and conferences including IEEE Transactions, IET Journals, Science Direct and Elsevier Journals. He is a member of IEEE, IET, IE, ISTE and invited as session chair in India and abroad. He has delivered more than 70 invited talks at various national and international events in IITs, NITs and foreign universities. He was invited by Royal University of Bhutan to establish new program in power engineering. He was a Convener of 7th International Conference on Power Systems, 2017 (ICPS 2017) and Co-Convener of 8th National Power Electronics Conference, held at College of Engineering, Pune in December 2017.

Er. P. Foerd Ames.,

Chief Guest, Inaugural Function,
Inventor, Owner, Ocean Wave Energy Company,
USA

BIOGRAPHY

Foerd Ames invented OWEC ®, Ocean Wave Energy Converter and the first wave driven linear electrical generator, 1978, and founded OWECO Ocean Wave Energy Company. He constructed self-supported modules that generated electricity from waves, 1982, with intention for producing purified water and hydrogen gas. Holder of several patents and trademarks since 1980, his research group constructed novel generator topologies and developed computational performance descriptions. OWEC® technology received USA federal and state contracts, National Award for Energy Innovation, and is subject of several publications and demonstrations. World over Industry participant in renewable ocean energy conversion, Foerd helps establish international law regarding marine hydrokinetic project deployment. He has been technical reviewer to international governmental and private entities including US Technical Advisory Group, International Electrotechnical Committee TC 114; Intergovernmental panel on climate change; California Energy Commission; Gerson Lehrman Group Council of Advisors. OWEC® maintains the longest continually active web site on ocean wave energy conversion, since 1994, and information related to water purification/cycling and hydrogen production. Foerd received dual degrees from Rhode Island School of Design, USA in 1980.

ICAPE -18

International Conference on Advances & Practices in Electrical Engineering Nagpur, Maharashtra 08th & 09th March 2018

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**Nagpur, Maharashtra
08th – 09th March, 2018**

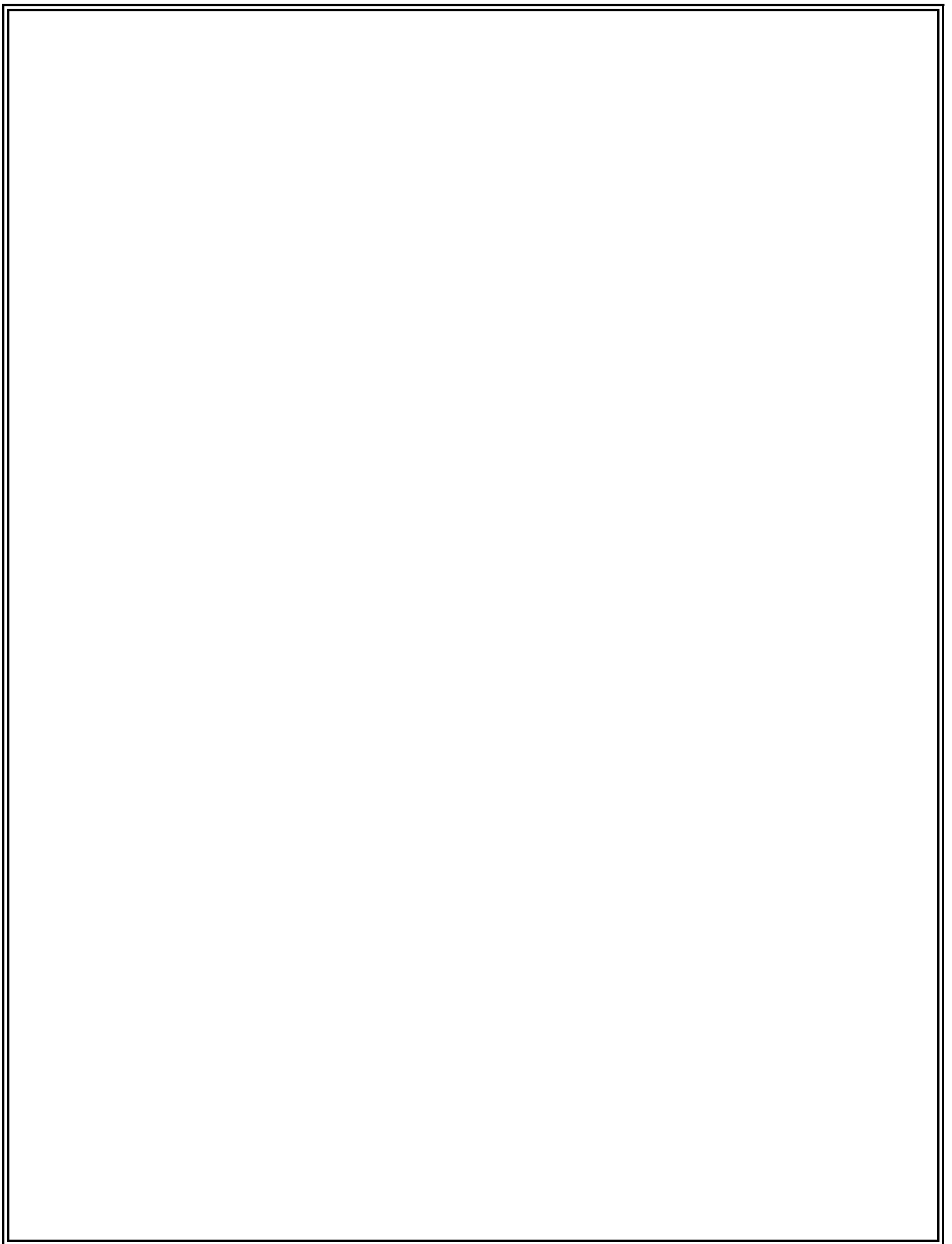
ABSTRACTS

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International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Study of effect of magnetizing inrush current on power transformer using MATLAB

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Abstract:--

This paper provides effect of magnetising inrush current on power transformer. At the time of energization power transformer draws high current called as transformer inrush current. With the help of Triac, as a high switching device magnitude of inrush current at various switching angle is studied. Inrush current normally appears due to saturation of magnetization of iron core, when power transformer is switched on no load. In the proposed method Triac is used for the short period of time for energization of transformer. By controlling the phase angle of Triac magnetic inrush current is reduced. To study the performance of proposed method simulation of power system model is carried out in MATLAB and inrush current at various switching angle is studied.

Keywords:--

Power transformer, Inrush current, Transients, Triac, Switching angle, MATLAB

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Electric Vehicles- Drive the Future

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Abstract:--

The key issues of 21st century are the combination of rising fuel prices, depletion of fossil fuels and increasing carbon dioxide pollution presents challenges to economies across the globe. The 60% petroleum is consumed by vehicles in the world. Every nation is looking into alternative options of energy efficient transportation solutions. Electric vehicles (EVs) segment are the only alternative for clean, efficient and eco friendly urban transport system. Electric vehicles are being popular across the world but they are having some problems associated with driving range, energy storage system and stored energy management. This paper presents a new strategy of energy management between battery and supercapacitors, renewable approaches to generate the electricity; new speed-torque control approach and an energy management system for electric vehicles .Electric drive are smooth, quiet also save a huge amount on running cost. Electric vehicles will also helping the environment too through reduced carbon emission. The main contribution of this paper is focused on improvement in torque-speed performance and range extension of an electric vehicle.

Keywords:--

Global warming, Driving range, Energy storage system, Energy management system and supercapacitors

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

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Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Matrix Converter: A Novel Topology for Single to Three Phase Conversion

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Abstract:--

In this technological era, where development and flexibility is of utmost significance the power requirement and demand is increasing. Currently three phase supply is mostly pressed into service than single phase supply considering the economical aspects and efficiency. The requirement of flexible energy options gave rise to the introduction of the matrix converter topology which eliminates the drawbacks of conventional topologies presently used. This paper presents the matrix converter for single stage conversion of the single phase ac to three phase ac. The research work about the matrix converter topology has increased since last few decades thereby emphasizing it for industrial applications. This paper presents the basic operation strategy of single to three phase converter and is explained with the help of an analytic method of separation and link. Detailed analysis for the matrix converter with a three phase balanced load is provided to confirm the validity and feasibility of this strategy.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

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International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Different topologies of Coupled -inductor based High step-up dc/dc Converter

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Abstract:--

Entire planet will be managing insufflate force supply restrictions What's more awful impact from claiming nonrenewable vitality wellsprings consequently interest about clean vitality builds and PV will be playing significant part for era about clean vitality. Should gotten secondary venture up voltage pick up for helter skelter efficiency, we require productive DC-DC converter. This paper provide data identified with a few kind of topologies utilization over coupled inductor built stacked and Cascaded sort for converter Furthermore holes and also medicinal recommended converter structure is also quickly demonstrated.

Keywords:--

Renewable Energy,High step up, Couple-inductor, DC/DC converter, cascaded and stacked topology

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

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Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Bidirectional AC/DC Converter PWM Strategy to Reduce Switching Loss with Feedforward Control in Grid-Tied Micro Grid System

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Abstract:--

This paper proposes the simplified pulse width modulation (PWM) strategy in the bidirectional ac/dc single-phase converter with the feed-forward control scheme. In this, the number of switching of the proposed simplified PWM strategy is reduced to one-fourth to that of the unipolar & bipolar PWM. The feed-forward control scheme is used to achieve better performance of the ac/dc converter in both the rectifier & inverter mode as compared with the conventional dual-loop control scheme. The simplified PWM strategy with feed-forward control scheme has higher efficiency than that of the unipolar PWM & bipolar PWM strategies. Also, the total harmonic distortion is less in this PWM strategy. The simulation & experiments are carried out to verify the validity of the proposed PWM strategy & control scheme.

Keywords: --

Simplified PWM strategy, Feed-forward control, Bidirectional ac/dc converter.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

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Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Performance analysis Of Switch Reluctance Motor Used as a Variable Speed Drive

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Abstract:--

Now day's electric motors are used in a wide range of industrial applications. What most applications have in common is the need for their motor to be as efficient as possible and to have the longest possible lifetime while simultaneously not increasing maintenance demands or failures. The switched reluctance motor represents one of the oldest electric motor designs around. A variation on the conventional reluctance machine has been developed and is known as the "switched reluctance" machine. This development is partly due to recent demand for variable speed drives and partly as a result of development of power electronic drives. The name "switched reluctance", describes the two features of the machine configuration: (a), switched, the machine must be operated in a continuous switching mode, which is the main reason for the machine development occurred, only after good power semiconductors became available; (b), reluctance, it is the true reluctance machine in the sense that both rotor and stator have variable reluctance magnetic circuits or more properly, it is a doubly salient machine.. In this paper with the help of various techniques SRM is used as a variable speed. The main problem is higher torque ripple and acoustic noise as compared to conventional motor. To reduce torque ripple direct instantaneous torque control method is used. Direct instantaneous torque control is fast and accurate response. This method can generate smooth torque as well as low losses as compared indirect instantaneous torque control method. This method gives the reference value of phase torque from the desired torque with the help of torque sharing function. Hysteresis controller is used to switching signals generated from reference phase torque and estimate phase torque.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

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Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Digital Sigma Delta Modulators: An Overview

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Dr. G. H. Agrawal., Dean, KDK College of Engineering, Nagpur, India

Abstract:--

The audio devices use Sigma Delta DAC (Digital to Analog Converter) a most essential block at the receiver side. This DAC has many blocks out of which noise shaping loop also known as Sigma Delta modulator is all digital circuit. The area and power consumption and speed of this block affects the performance of the entire DAC. There are various types of Sigma Delta modulators available. Different methods are developed for the performance improvement of these modulators. This paper discusses in detail various types of digital Sigma Delta modulators and different performance improvement techniques available.

Keywords ::--

area, delay, error feedback, MASH, power Sigma Delta DAC

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Energy conservation and management using BEMS

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Dr. G. H. Agrawal ., Professor, Dean, Electrical Department, Kdk College of Engineering, Nagpur.

Abstract:--

The worldwide and most common issue in today's world is energy conservation Buildings are designed for both residential and commercial use. Generally larger the building area there is probability more people will be using which will increasing the energy consumption. There are several ways to save energy by energy conservation.

In this paper we have discussed the most efficient way to save energy in buildings by using Building Energy Management System (BEMS). This system uses a broader mix of energy source in which the major preference is given to the renewable domestic energy sources. To control the whole system it is proposed to use SCADA By using BEMS it is expected that all major sources required in daily life are controlled efficiently and energy saving is done with the help of BEMS.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Use of Superconducting Power Cables for Fault Current Analysis

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Nishtha S. Waghmare., KDKCE, Nagpur.

Rakshit D. Kadoo, KDKCE, Nagpur.

Dr. Mrs. A. Sudha., KDKCE, Nagpur.

Abstract:--

A superconducting power cable is an application of high-temperature superconductors. Even though superconducting power cables have been developed worldwide for the grid application here the focus is on railway application. Introducing superconducting power cables effectively and economically to a DC electric railway is suggested. The aim is to upgrade the feeder of the overhead contact line system using superconducting power cables. The fault current of dc electric railway feeding systems using superconducting power cables is analyzed. Matlab-simulink electric circuit models based on a model railway line are constructed for numerical analysis of short-circuits and grounding faults. Influence of introducing superconducting power cables under different fault conditions is analyzed.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Implementation and Analysis of Three Phase Voltage Source Inverter

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Mrunali Salve., Department of electrical engineering, KDK College of engineering, Nagpur, India.

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Abstract:--

As we know that inverter plays an important role in motor drives, flexible power transmission and recently grid type renewable energy generation units. A variety of PWM methods have been put forward and studied in detail since the concept of PWM were introduced into the voltage control in the voltage source inverter. So far the SPWM and SVPWM are widely used in most applications. Here SPWM technique is used because it is more easily realized digitally. Whilst this advantages are certainly good but excessive use of power electronics devices results in generation of current harmonics and reactive power issue in power system network. These harmonics current pollutes the power system causing problems. Hence to provide clean power at the end, LC filters are used. Here the reduction of output filters results in higher bandwidth and higher power density system. The reduced output filter coil are beneficial for weight, cost and the performance of the inverter. The main purpose of this paper is to provide an instructive survey of existing fault tolerance techniques for three phase voltage source inverter. The output waveform of a three phase PWM inverter is tested both theoretically and experimentally. In this analysis we observed that harmonics are lower than the 15th are all less than 1% of fundamental components when the frequency ratio is relatively low. The result shows possibility in obtaining practically sinusoidal output waveforms.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

State Space Modeling of Multi-Machine Power System installed with PSS, for small signal stability analysis

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Abstract:--

This paper presents the detailed study and procedure for modeling Multi-machine power system installed with Power System Stabilizer (PSS). In this paper, a linearized State Space Model of Multi-machine power system, installed with PSS, has been realized. The procedure has been implemented on a standard IEEE 3 machine system for deriving its corresponding linearized state space model. Importance of modeling the Power System network, for carrying out the small signal stability analysis and damping out the low frequency oscillations, has also been discussed in this paper

Keywords:--

IEEE 3 bus system, Low frequency Oscillations, PSS, Small Signal Stability.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Asymmetrical Fault Detection Using Thyristor-Bridge

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Abstract:--

A distribution line is de-energized for repairing or maintenance purpose. Fault detection is required in order to re-energize the line safely. It is more difficult to detect fault in de-energized lines as it requires system level voltage production and execution to downstream. Implementation of asymmetrical fault detection technique by controlling a thyristor based device is proposed in this paper. The proposed method involves injecting a thyristor based controllable signal to the de-energized feeder. The responses of feeder voltage and current are observed to identify if a fault still exists. A thyristor gating control strategy and fault detection algorithm are also developed to detect all types of asymmetrical faults that can occur in system. The effectiveness of the proposed method has been verified through MATLAB simulation.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Enhancement of power System Performance by using SSSC

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Dr.Prakash G. Burade., Professor & Head, Dept of Electrical Engg., SITRC, Nashik

Abstract:--

Static Synchronous Series Compensator (SSSC) is a voltage sourced converter based series FACTS device that provides capacitive or inductive compensation independent of line current. This paper presents the achievement of the required active and reactive power flow into the line for the purpose of compensation as well as validation of enhancement of the power system performance of a transmission line by connecting the SSSC on appropriate location. The effect of variation of the phase angle of the injected voltage on the power system parameters such as sending end voltage, transmission angle, active power, reactive power, and overall power factor with and without SSSC have also been incorporated. The Performance of power system have been tested on IEEE 14-Bus System.

Keywords:--

flexible ac transmission (FACTS), static synchronous series compensator (SSSC), voltage sourced converter (VSC), static compensator (STATCOM).

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Simulation of 33/11kv Substation, Medical Zone Ajni, Nagpur by Using ETAP® Software

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Abstract:--

For development of any country power is an essential requirement. Power losses, under volage, over volage are the main causes to maintain the power in transmission and distribution system. To reduce such problems the innovative concept introduce in this paper. This paper deals with simulation of 33/11kv substation, Medical Zone Ajni, Nagpur by using Electrical Transient Analyzer Program(ETAP®) Software, Which can perform numerical calculation of large integrated power system with tremendous speed and provides easy to follow output reports. Recorded data is obtained from an actual 33/11kv substation which has been implemented in ETAP for the simulation.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Review on Grid Interconnected wind Generator System

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Chanchal Yadav, B.E ,Electrical Department, Kdk College Of Engineering,Nagpur

Mrs.V.B.Hardas, Assistant Professor, Electrical Department, Kdk College Of Engineering,Nagpur

Abstract:--

Integrated system consists of number of generating station that carry power from distance sources to distribution lines and demand centres. But there occurs certain issues during short circuit and frequency stability after sudden loss of generation.

The major issue of wind Generating System is the Inherent variability and uncertainty of wind during the performance which leads to insecurity of the whole system. In this paper the two phenomena having vital role in the whole wind power system are discussed namely behaviour of wind generation plants in steady state and frequency stability. Integrated system is consists of number of generating stations that carry power from distant sources to distribution lines and demand centres. But there occurs certain issues during short circuit and frequency stability after sudden loss of generation.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Super Hydrophobic Antireflective Coating to Enhance Efficiency of Solar PV Cells

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Abstract:--

Efficiency of solar panels is greatly affected by dust and soiling. Solar panel reflects a considerable amount of light which also decrease the efficiency. Every day cleaning of solar installation is time consuming and costly. Hydrophobic coating works as anti dust coating so it will enhance the efficiency and decrease the cost of cleaning of solar cells. In India most of solar projects are situated in arid areas (MP, Gujarat etc) where dust decreases efficiency of solar cells. Thus by combining these two properties and applying superhydrophobic and antireflective coating we can increase the efficiency of solar cells by 25-40%.

Keywords:--

Superhydrophobic, antireflective, efficiency, selfcleaning, coating.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Study and Review of Cables Used In Solar Installations

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Abstract:--

Planning and installation of a PV power plant involves lot of calculation and design of electrical circuitry. For a roof top or ground mounted efficient solar power plant, it becomes very essential that all energy generated get transferred to load as the efficiency of PV cell is relatively very less and installation is a costlier process. The power transmission to cables need good design, selection and careful handling. Cables are subjected to thermal, mechanical and electromagnetic stresses. For a long lasting electrical circuit with exposure to harsh environmental condition like temperature fluctuations and UV rays, it becomes necessary to protect the cable network. This paper reviews the conductor and cables used in solar installations, it also gives the specification difference in normal DC power and DC cables used in solar system.

Keywords:--

1. DC Cables
2. PV Power Plant
3. DC Power
4. Installation
5. PV Cell

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Harmonic analysis of PWM based shunt compensator using dynamic harmonic domain

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Abhay M.Halmare., Department of Electrical Engg, KDK college of Engineering, Nagpur, India

Abstract:--

The extended or dynamic harmonic domain method is used to obtain harmonics during steady dynamic states for static shunt compensation (STATCOM). Firing pulses used for voltage source converter (VSC) are based on pulse width modulation PWM, and the simulation results obtained during steady state are validated by prototype panel experiments. The voltage and current harmonics are observed for STATCOM VSC switching.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Desing and Analysis of Piezoelectric Energy Harvesting Device

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Abstract:--

Power energy requirement requires a huge amount of an alternate sources of energy to fill up the large gap between demand and supply of electricity, also they should be clean, environment friendly and sustainable. With increase in demand the use of non renewable energy sources is also increased due to this lots of energy sources are exhausted. This paper focus on power generation through power harvesting device as there are different power harvesting devices which are used to generate energy from surroundings such as piezoelectric, electromagnetic, solar, flowing water etc. Out of such devices piezoelectric power generation is one such device which is used to extract energy by means of mechanical force and vibrations. Piezoelectric materials have ability to build up an electric charge from pressure and strain applies to them.

Keywords :—

Power harvesting device, Piezoelectric sensor, Vibration, Energy Conversion, Energy Storage

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Smart Solar Irrigation System

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Abstract:--

This paper proposes a model of variable rate automatic micro controller based irrigation system. Solar power is used as only the source of power to control overall system. Sensor is placed on paddy field and these sensors continuously sense the water level and give the message to the farmer informing the water level without visiting the paddy fields.

Cost effective solar power can be the answer for all our energy needs. Solar powered smart irrigation systems can effectively use by all farmers of India. This system consists of solar powered water pump along with an automatic water flow control using a moisture sensor. It is the proposed solution for the present water crisis for the Vidarbha farmers.

This system conserves electricity by reducing the usage of grid power and conserves water by reducing water losses.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Performance Analysis and Improvement of power Transmission line Network Using Unified Power Flow Controller

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Abstract:--

The Power generation is achieved by increasing rural electrification are used by minimizing the transmission line losses. The Power Flow by used on the recently developed of the power system network UPFC of the latest technology facts devices used of the Transmission line. It is used to compensating the active and reactive power control to the power flow with the increasing the stability of the transmission line to control the flow of power in the transmission line as well as to improve the quality of Active and Reactive power. Power system network it is used of the without UPFC and with UPFC different buses line Matlab/Simulink.

Keywords:--

Facts devices, without UPFC, With UPFC, Active and Reactive power.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Speed Performance of Three Phase Induction Motor by using Simplified Vector Control method

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Khushboo Baraskar., Lecturer, KDKNPN, Nagpur, Maharashtra, India.

Abstract:--

Three phase induction motors are the most commonly and frequently encountered drives in industry, as it has simple design and less maintenance. The speed performance of the motor is based on the simplified vector control method by using PI and PID controllers in MATLAB software. The controller has then been tuned by trial and error method and simulations have been run using the tuned controller. Using simplified vector control method, the performance of induction motor has been carried out on the basis of torque and speed. Implementation by using various proportional controllers using vector control scheme has been done. The PI, PID controller has been used to develop the simplified control system. The performance of three phase induction motor is carried out for no load and full load condition. For various load condition and various system design using proportional controller, overall performance is drive is figured out. On the basis of simulation results of without feedback system controllers are designed with specific values. The performance of three phase induction motor is improved with the use of PID which gives better settling time with reduction in overshoot as compared with PI controller. Comparison of the various system designs has been done.

Keywords:--

Three Phase Induction Motor, Vector Control Method, MATLAB, PI & PID

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Review of Different Pwm Techniques

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Abstract:--

In AC the quality of sinusoidal waveform is more important than the quantity .In order to improve the quality the harmonic content in the output must be reduced. To achieve this, different pulse width modulation techniques are used for different applications.

This paper presents the overview of carrier based pulse width modulation techniques as a single pulse width modulation, multiple pulse width modulation, sinusoidal pulse width modulation and also deals with hysteresis current control techniques.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Partial Discharge in Solid Insulating Materials, Causes, Effects and Factors of Dependence -A Comparative Investigation

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Abstract:--

Widespread use of heavy duty machinery in industrial setup has rendered the power supply and insulation network highly prone to various types and degrees of damages depending on the type and intensity of workload. Insulation damages generally lead to the production of partial discharges. This may be effectively used for online monitoring of insulation of plant thereby leading to a substantial decrement in the unwanted downtime. In this context the present work explores the various causes associated with the incurrance of partial discharges in an insulation system and consequent effects of the same. Furthermore, a comprehensive investigation has also been done regarding the factors on which amplitude of partial discharges depend, namely, supply voltage variation, changes in dimension (i.e. size) of void or impurity in the solid dielectric and variation in number of voids (i.e. amount of impurity) in the solid dielectric. Finally, a comparative investigation is done using three solid dielectrics which are mainly used in industries, i.e. epoxy resin, dielectric paper and porcelain. The present work is based on a complete analytical study with the partial discharge model being developed in MATLAB/Simulink using high tension system in the range of 6 kV to 25 kV.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Automatic Glucose Water Dispenser Based on Solar Energy

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Praful P. Bharate., Department of Electrical Engineering, K.D.K. College of Engineering, Nagpur

Yogesh S. Nakhate., Department of Electrical Engineering, K.D.K. College of Engineering, Nagpur

Kirti M. Dhenge., Assistant Professor, Department of Electrical Engineering, K.D.K. College of Engineering, Nagpur

Abstract:--

This paper presents the description of automatic glucose water dispensing machine that will operate on solar energy as well as hybrid power system. This machine works on coin detection technique and is designed for multiple coins. The machine will provide the standard quantity and also various quantities for various coins (customized). This machine is designed using the 89c51 microcontroller and also aims at economic purpose. It will be energy efficient machine as solar energy is used and will serve the purpose for providing energy drinks at different places like hospitals, commercial buildings, railway stations, bus stop, etc. it can prove to be of great use and user friendly.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Channel Estimation and Modelling for Underwater Acoustic Sensor Network

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Dr. G. G. Sarate., Professor & Supervisor, Govt. Polytechnic, Amravati

Abstract:--

Underwater wireless communication is a rapidly growing area of research and engineering. Various scientists are exploring fundamental aspects of Underwater Acoustic Communication for various underwater applications like Oceanographic data collection, Pollution monitoring, offshore exploration, Disaster prevention, Assisted Navigation, Tactical Surveillance and Mine Reconnaissance. To achieve this objective, sensors and vehicles self-organize in an autonomous network, which can adapt to the characteristics of the ocean environment. The above described features enable a broad range of applications for underwater acoustic sensor networks. Acoustic communication transmission technology is used for this UWASN (Underwater Acoustic Sensor Network), but still due to the physical properties of the propagation medium, underwater acoustic signals suffer from severe transmission loss, time-varying multipath propagation, Doppler spread, limited and distance-dependent bandwidth, and high propagation delay. Also waves under the water is scattered and propagates very slow which produces the propagation delay in it. The scattering nature of underwater communication channel raised the problem of multipath fading, Doppler delay, Doppler shift and Doppler spread. The proposed system gives the maximum possible solution to all these issues using maximum entropy modeling method where, the channel is modeled based on the Gaussian distribution for the rapidly time-varying delay factor. In this method the Doppler spread is identified between the transmitted signal and the received signal. Also, as the communication under the water gives scattering nature of transmission, the bit transmission rate and bit error rate are calculated based on channel transmission scheme using OFDM.

Keyword:--

Underwater Sensor Network, Acoustic Signal, Acoustic Channel, OFDM, Channel Estimation, Channel Modelling.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Review of TSR as a SVC for Reactive Power Compensation in Transmission Line.

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Abstract:--

Day by day energy consumption is increasing. Hence, it is an urgent need to increase power generation and in turn increase in power transmission capability. This can be achieved by Flexible AC Transmission System (FACTS) which is an emerging technology and can improve power transfer scenario around the world. It improves the power transfer capability of existing transmission system which enhances reliability and security of the system. It also achieves better controllability with stability in power transmission networks. The variation in reactive power have an effect on the power system equipments.

The local Volt-Ampere Reactive (VAR) compensator which is comprising of shunt reactors is used in transmission and distribution system for reactive power compensation. A SVC performs such system improvements and benefits by controlling shunt reactive power sources such as TSR with the help of power electronic switching devices. The power electronic reactive power compensator uses fast switching action than the conventional relay. The static VAR compensator is the arrangement of Thyristor Switched Reactor (TSR). TSR switching can be controlled by pulse given to thyristors which is produced by pulse generator.

TSR Simulink model consist of three single phase units which are connected in delta connection. Each TSR unit consist of anti-parallel connections of two thyristors in series with the inductor (L).

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Load Flow Analysis Using Facts Device

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Prof. A.S. Telang., Assistant Professor, Electrical Engineering, P.R.Pote College of Engineering and Management, Amravati, Maharashtra, India

Abstract:--

Electrical power systems is a large interconnected network that requires a careful design to maintain the system with continuous power flow operation without any limitations and for the steady state operation of the power system. To achieve this requirement, new technology such as FACTS device is used in load flow analysis. Flexible Alternating Current Transmission System (FACTS) is an application of a power electronics device to control the power flow and to improve the system stability of a power system. STATCOM is a versatile device in the FACTS family of controllers which has the ability to simultaneously control all the transmission parameters of power systems i.e. voltage, impedance and phase angle which determines the power flow of a transmission line. This said research work is mainly focused on implementation of steady state model of STATCOM in Newton Raphson method. The Standard IEEE bus system will be used to verify the effectiveness and performance of the model. The simulations are carried out on standard IEEE bus test system like 30 bus system under the MATLAB environment.

Index Term:--

Load Flow Analysis, FACTS, STATCOM, Newton Raphson Method

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Improved Instantaneous PQ Theory based Reference Current Generation Algorithm for Shunt Active Power Filters

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Abstract:--

Performance of an active power filter mainly depends on accurate generation of reference current. The most commonly used method is the instantaneous PQ theory based reference current generation scheme. Although it is advantageous in many aspects, but it fails to achieve desirable compensation results under unbalanced supply voltage condition in three phase electrical power systems. Therefore this issue is addressed in this work and a suitable improved version of Instantaneous PQ theory is presented. The proposed theory is validated by the results obtained through simulation based studies.

Index Term:--

Power Quality, Harmonics, Shunt Active Power Filter, Reference Current Generation Algorithm.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Protection of Transmission Line Using Cosine Phase Angle Function

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Abstract:--

The transmission line consist of different types of fault which leads to the power loss in it. For the protection of the transmission line different types of methods are used such as, differential protection scheme, cosine phase angle methods etc. Differential protection scheme compares the magnitude of both end of current and detect the error as the magnitude of current is been considered so the accuracy of the scheme may get affected. In this paper we proposed the cosine function algorithm which improves the phase comparison and compensate the error due to the line charging current .In this method we consider the phase angle of both the end current and using cosine function the angle is been calculated and it is compared with threshold value of angle. In this way it may improve the sensitivity, selectivity & simplicity of the system.

Key words: --

Algorithm, Cosine, Threshold, Sensitivity

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Study of single phase multilevel inverter for PV Application

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Abstract:--

Solar photovoltaic modules are used to generate electricity from solar energy. The voltage generated during solar PV modules is DC in nature. However, most of the applications require AC quantities as input. Hence, multilevel inverters are employed to convert the DC voltage output of the PV module into AC voltage. In this paper, a detailed study of PV module is presented along with its modeling and simulation results showing the I-V and P-V characteristics obtained at different irradiance levels. The paper also includes the study of cascaded Hbridge inverter topology with different configurations. Further, a comparative study is carried out between EPWM (Equal pulse width modulation) and SPWM (Sinusoidal pulse width modulation) techniques which enables to select the technique resulting into less harmonics for further simulations. The harmonic contents are determined with the help of FFT analysis in MATLAB.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Mathematical Modeling and Simulation of BLDC Motor Performance using MATLAB/SIMULINK

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Abstract:--

The paper presents the mathematical modeling of BLDC motor and its simulation in MATLAB. The BLDC motor is electrically commutated by power switches instead of brushes. The BLDC motor has wide variety of applications therefore its modeling has been done. BLDC motor is rapidly gaining popularity. It can be used as an alternative for traditional motors like induction motor, brushed DC motor, etc. The torque characteristic plays a very important factor in modeling and designing of BLDC motor drive. The mathematical model of three phase motor with trapezoidal waveform type back emf is done by using MATLAB software. The performance parameters are analyzed using MATLAB software. The results obtained by using MATLAB software are highly acceptable and this gives very important information for modeling of BLDC motor drive system.

Keywords:--

BLDC motor, mathematical modeling , Torque , back emf, Matlab/simulink

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Three Phase Voltage Source Inverter with a Novel 150° Conduction Mode

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Aniket Mahajan, Department of Electrical Engineering, K.D.K. College of Engineering Nagpur, India

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Abstract:--

In today's world, where power demand has enhanced significantly, the reliance on flexible energy options has also increased. Our design is an attempt to take a DC input and convert it into a three phase AC output by a novel 150° conduction topology. This paper presents a new conduction topology for most common, simple and well known three phase voltage source inverter. In this modification each switch conducts for 150° instead of the usual 180° or 120° conduction modes. For a star connected load, the output phase voltage becomes a seven levels and twelve steps waveform- which are closer to the sinusoidal waveform. This results in a 50% reduction of the total harmonic distortion. A comprehensive study for the three modes of conduction is proposed. To confirm the validity and feasibility of this modification, the simulation is carried out with a three phase balanced load. The results obtain shows that in comparison with 180° and 120° conduction mode, 150° Conduction mode is better and feasible.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Study of Solar, Biogas and Wind Micro-Grid at Sanjeevan Socio-Medical Foundation, Nagpur

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Akshay Thombare., BE 8th Semester Electrical Engg, Electrical Department, K.D.K. College of Engineering

Dr.(Mrs.)S.S.Ambekar., Professor & Head, Electrical Department, K.D.K. College of Engineering

Abstract:--

In India most of the electricity is produce by thermal power plant and many of them are located in central India. Thermal power plants use coal as a fuel, which will release sulphur dioxide in environment during combustion, also the land after extraction of coal will became infertile and of no use, hence in this region use of clean energy is require immediate attention. Power generated by the solar, biogas and wind which are renewable and cause zero pollution, from this renewable resources we can form a micro grid which will be able to generate enough power for the small regions with battery and loads. In central India the intensity of sunrays is good for generation of electricity by using solar panels.

This paper presents study of such type of micro grid which is installed at Sanjeevan socio-medical foundation near Nagpur (central India) which consists of solar plant which generates 2 KW, biogas plant which generates 12 KW and wind plant which generates 1 KW. This micro grid is connected to the main power grid and it is self dependent in almost every season. The area of foundation is also lit by using solar street lights. This type of micro grids should be installed in central India in more numbers because of the advantages like no fuel cost, predictable 24/7 power, no pollution and global warming effects.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Study of Wind Energy System with Fuzzy Controlled Statcom

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Shradha R. Chahande., KDKCE, Nagpur.

Mrs.V. B. Hardas., KDKCE, Nagpur.

Abstract:--

The paper study shows the power quality problem due to installation of wind turbine with the grid. When the wind power is injected into the electric power system it has stability problem. Fixed speed induction generators needed reactive power to maintain air gap flux. The Static Synchronous Compensator (STATCOM) near a wind farm is investigated for the purpose of stabilizing the grid voltage. The STATCOM is use with wind energy system at point of common coupling to reduce power quality issues. The control scheme for grid connected wind energy system with statcom is simulated using MATLAB for the purpose of power quality improvement in power system. The simulation results reveal the performance of STATCOM in conjunction with PI controller. In this paper fuzzy logic controller is used instead of PI controller for reducing total harmonic distortion in the source current of the grid connected wind energy generating system. For the power quality improvement of the grid connected wind energy generating system a STATCOM control scheme is simulated using MATLAB the power system block set by using Fuzzy logic controller.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Performance Improvement of a Quadcopter as a Surveillance Robot

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Abstract:--

Quadcopter is an unmanned four rotor helicopter, which works on principle of aviation, Newton's Third Law, Faraday's Law of electromagnetic induction and Modern Power Electronics. This paper deals with design, hardware implementation, control technique and programming for quadcopter. It is observed that with modifications in aerodynamic design of frame, electrical circuits and electronic speed controllers, the quadcopter performance has been improved. The quadcopter is able to travel at higher speed with more accuracy and gives better video transmission resulting into a better surveillance robot.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

A Review on Protection of Compensated Power Transmission Line

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Abstract:--

This paper presents a survey of present and past developments in the field of protection of transmission lines having FACTS devices and also suggests the best suitable solutions for the problems. In present time extra high voltage transmission lines are used to transmit large amount of power over a wide interconnected power network. Transmission lines are capable of transmitting electric power up-to its thermal limit. To utilize the full capacity of transmission line for transmission of electric power over a power network, flexible alternating current transmission systems (FACTS) are installed in the transmission line at different locations. Presence of FACTS systems changes the transmission parameters and hence adversely affects the transmission line protection system by creating problems viz. reaching problem, zone setting, inversion (voltage and current) and resonance issues. Therefore, there is a great need to identify the wider impact of different FACTS devices on the existing protection system and simultaneously the remedies of the problems

Keywords:-

Adaptive relaying, artificial neural network, flexible alternating current transmission system, impedance relay, over voltage, over-reaching, under-reaching, transmission line protection, support vector machine, wavelet transform, zone setting.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

A Simulink Model of PV Array Using P&O Technique for Maximizing the Power

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Abstract:--

The following paper is based on simulation of Perturb and Observe (P&O) technique to find the maximum power point of a photovoltaic cell (PV cell). The maximum power point tracking (MPPT) algorithm is based on incrementing or decrementing either the voltage or current. It leads the operating point to maximum power output. Standard test condition of 25o C temperature and 1000 W/m² irradiance have taken. The system is design for 2 KW resistive load. Boost converter is used to get the desired output level. The performance of boost converter is compared with different values of inductance and capacitance. Also the voltage ripple factor of output is minimised.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Solar Power Ultraviolet Water Purification System

Pranav vispute., K.D.K.College of Engineering, Nagpur

Binay Tandon., K.D.K.College of Engineering, Nagpur

Prasanna Titarmare., K.D.K.College of Engineering, Nagpur

Abstract:--

Water purification is the process of removing undesirable chemicals, biological contaminants, suspended solids and gases from water. Most of the purifiers work using non-renewable sources of energy which are costly and not available in remote areas. So, here we are collecting solar energy by using solar panels as an energy source which is available in plenty at all places to generate electricity. "Water purification using solar ultraviolet system" is an effective method of purifying water since it uses non-conventional source of energy to run the ultraviolet system which makes it cheap and maintenance free. Ultraviolet (UV) rays penetrate harmful pathogens in water and destroy illness-causing microorganisms by attacking their genetic core (DNA). This is extremely efficient in eliminating their ability to reproduce. UV systems destroy 99.99% of harmful microorganisms without adding chemicals or changing your water's taste or odor unlike other treatment methods. It is a set and forget type of system which requires just changing UV bulb annually.

Keywords: -

photovoltaic panel ,ultraviolet bulbs, UV tank ,settling and Storage tank.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Reduction of magnetic inrush current of power transformer using MATLAB

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C. J. Sharma., Assistant Professor, Student 8th Sem, Dept. of Electrical Engineering, K.D.K.College of Engineering, Nagpur.

Abstract:--

In power transformer initially current is very high value, which cause to produce the inrush and it effects the transformer core during the period of initial current and this initial current is known as magnetic inrush current. During this period the life of transformer, protective equipment, as well as power quality is of supplying power will reduced. So, this initial current reduction is very important for the reduction of inrush, controlled transformer switching can provided to reduce the magnetic inrush current. This paper shows the practical consideration of minimization of magnetic inrush current as well as experimental result of simulation. In this paper use a thyristor to control the firing angle of current. This paper shows the theory to explain and experimental result of reduction of inrush current at different firing angle using MATLAB simulation.

Keywords:-

magnetic Inrush Current, And Transformer, Switching Devices, Thyristor.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

A Review of Different Power Harvesting Devices Used For Energy Generation

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Abstract:--

Power generation from different methods has seen a significant rise in past few years as both conventional and non conventional methods are becoming absolute. Also the different methods of power harvesting have seen significant increases because of increase use of portable design of various power sources including batteries. The concept of capturing the normally lost energy surrounding a system and converting it into electrical energy that can be used to extend the lifetime of that system's power supply and has brought forth a growing amount of attention to power harvesting. Many energy generation devices are design to convert any of mechanical, electromechanical, waves, flowing water, solar etc into a usable electrical energy. The advances have allowed numerous doors to open for power harvesting systems in practical real-world applications. This paper gives a detail study of various such energy harvesting devices and methods by which these electrical energy can be extract from these sources.

Keywords:--

Power harvesting device, Piezoelectric sensor, Vibration, Energy Conversion, Energy Storage

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

“Design of Renewable Power Plant Using Matlab”

Prititidake., K.D.K. College Of Engineering Nagpur, India

Abstract:--

Design and the simulation of a photovoltaic power generation system using MATLAB and Simulink software. The power plant is composed of photovoltaic panels connected in series and parallel strings, a DC-DC converter and a three-phase inverter which connects to a 0.4 kV three-phase low voltage grid and a 20 KV medium voltage grid by means of a step-up transformer. The DC-DC boost converter uses a MPPT controller and the inverter uses a control method using SPWM .MATLAB is used to investigate the I-V and P-V characteristics of solar photovoltaic cell considering the effect of temperature, solar radiation, ideality factor, series resistance and shunt resistance of solar cell, number of cells in PV array and reverse saturation current.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Electrical Vehicle by Using Super Capacitor

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Abstract:--

Internal combustion vehicles use the fossil fuels for their operation which leads to the pollution in the environment. It emits the harmful gases such as CO₂,NO,NO₂,SO₂,etc which leads to the greenhouse effect causing the global temperature to rise by over 7 degree Celsius globally in last 50 years. ICV vehicles use petrol and diesel which are not abundant in INDIA so we have to import the fuel required for the vehicles which is costly.

The foreign exchange reserves of our county declining rapidly due to this and it puts a large pressure on the Indian economy. Electrical vehicles solve this problem but the battery powered electrical vehicles are very less efficient and takes a lot of time for charging and gets discharged rapidly. Efficiency of the ICV and the battery powered EV are less.

In this paper we are discussing the electrical vehicle uses super capacitor. A supercapacitor OR ultra-capacitor is an electrochemical capacitor that has an very high energy density as compared to common capacitors, about 100 times greater. There are several problems in batteries such as slow charging of energy in batteries and low life cycle. Super-capacitors are going to change the entire energy storage system. Due to super-capacitors the life cycle of the batteries would increase efficiency upto 95% life cycles. Super-capacitor energy system has good reliability, efficiency, less emission, and lower cost.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

AC Solar Generator Without Inverter

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Mayur kore., Electrical Engineering Department , K.D.K C.E Nagpur, India.

Dr. G.H. Agrawal., Professor at Electrical engineering Department, K.D.K collage of engineering Nagpur, India

Abstract:--

Due to increasing usage of electrical energy day by day the demand of electrical energy is increased. To meet this increased demand we have to use the non-conventional energy sources such as solar, wind, tidal, geothermal, bio-gas etc. Out of this solar energy can be one of the effective renewable energy source. Solar panel today produce a DC power which has to be firstly converted into AC by inverter.

This solar generation becomes very expensive when we add the price of solar panel, inverter, phase synchronizer. The efficiency also reduces due to power loss of different component that are used in DC to AC converter.

This paper discuss a new technique for the generation of AC power directly from PV cells without inverter. By this technique we can reduce power loss due to converter. We can generate the pure sinusoidal waveform by controlling the speed of DC motor. This can be achieved by microcontroller and motor driver. The speed control of DC motor plays a very important role to get pure sinusoidal waveform with variable frequency in this technique.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Electricity Generation through Biogas at Sanjeevan Socio Medical Foundation Nagpur

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Parag Kapgate., BE 8th Semester Electrical Engg, K.D.K. College of Engineering.

Prof. Diwakar Korasane., Assistant Professor, Electrical Department, K.D.K. College of Engineering.

Dr. (Mrs.) S. S. Ambekar., Head, Electrical Department, K.D.K. College of Engineering.

Abstract:--

: A biogas is a modern energy source and is suitable to necessities of the future with the appropriate application of the digestion technology. Renewable energy based resources has traditionally considered a single technology based limited level of supply to meet the basic needs. Three renewable resources namely solar, wind & biogas energy generation plant are installed at the sanjeevan socio medical foundation is to be considered. Thus the foundation produces their own electricity via solar, wind & biogas energy generator these systems will generally have battery bank in order to store the electricity for use when needed.

Thus by considering biogas electricity generation system biogas is a modern energy source and is suitable to necessities of the future with the appropriate application of the digestion technology. Biogas is the gas resulting from an anaerobic process. A biogas can convert animal manure green plants, agriculture waste. In a method of utilizing a methane-containing biogas by feeding the methane-containing biogas to a gas engine of a gas engine/generator assembly generating electricity, the steps of passing the biogas through a membrane separating installation to divide the biogas into a first gas stream having a higher methane content than the biogas fed thereto and a second gas stream enriched in CO₂, feeding the first gas stream to the gas engine as fuel, and returning the second gas stream to the source of the biogas.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

A Brief Analysis of Ac Drives and Its Importance in Automation

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Mr.C.J. Sharma., Asst. Prof., KDKCE, Electrical Engineering.

Abstract:--

This paper explains the description and operation of AC Drives (Variable Frequency Drive, VFD). The various benefits, applications, types and ratings of VFD are also studied in this paper. The use of VFD has been increased dramatically in the recent past over a wide range. This paper provides the basic understanding of how AC Drives are being used in the field of automation.

Keywords:-

Variable Frequency Drive (VFD), Automation, Energy Conservation

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Power Electronics and Electrical Drives for Wind Turbine Applications

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Mr. Kishor K. Hirekar., Department of Electrical Engineering, KDKCE Nagpur.

Mr. Nikhil J. Khobragade., Department of Electrical Engineering, KDKCE Nagpur.

Abstract:--

This paper presents a review of different solutions for small wind turbines of the order of fractional kW, designed for wind energy harvesting applications. Because the power characteristic of wind turbines is not linear, there are several topologies and control strategies for maximizing machine output power. In addition, the efficiency of the entire system depends on the type of the electrical drives that is used. The development of new designs of electromagnetic machine has good power density within a low cost constraint, coupled with appropriate power electronic control strategies that improve overall system efficiencies.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

A study of Change in Input Power Factor and Negative Sequence Current Component during Inter-Turn Fault in Dry Type Transformer

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Abstract:--

A power transformer is considered as an influential part of any power system network. The lifespan and performance of transformer mainly depends upon its load parameters. All industries necessitate reduction in cost of operation and maintenance of its equipment. A lot of techniques have been studied and developed concerning incipient fault detection in oil immersed transformer and dry type transformer for accomplishing its cost effective goals. From the analysis, inter turn faults has resulted in 70-75% transformer failures. Therefore, it becomes crucial to exterminate this fault at an initial stage henceforth saving transformer from severe faults, reducing outage time and loss of capital. In this present work a physical model of 10 KVA, 6600/550 Volt transformer is simulated in a power system using MATLAB/SIMULINK software. The experiment is performed at different percentages of inter-turn fault that is 1%, 3%, 5% and 10% on the secondary side of the multi-winding transformer and the change in power factor and negative sequence component of current is tabulated for corresponding fault. The present work is found beneficial in incipient fault detection in underground mines where only air cooled or dry type transformer is present and Buchholz Relay is absent to sense any emerging fault in the transformer.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Bidirectional AC/DC Converter PWM Strategy To Reduce Switching Loss with Feedforward Control in Grid-Tied Micro Grid System

Pranita Rajkuwar., Electrical Engineering Department

Sanjay A. Deokar., Electrical Engineering Department

Abstract:--

This paper proposes the simplified pulse width modulation (PWM) strategy in the bidirectional ac/dc single-phase converter with the feed-forward control scheme. In this, the number of switching of the proposed simplified PWM strategy is reduced to one-fourth to that of the unipolar & bipolar PWM. The feed-forward control scheme is used to achieve better performance of the ac/dc converter in both the rectifier & inverter mode as compared with the conventional dual-loop control scheme. The simplified PWM strategy with feed-forward control scheme has higher efficiency than that of the unipolar PWM & bipolar PWM strategies. Also, the total harmonic distortion is less in this PWM strategy. The simulation & experiments are carried out to verify the validity of the proposed PWM strategy & control scheme.

Keywords:--

Simplified PWM strategy, Feed-forward control, Bidirectional ac/dc converter.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Comparative study of MPPT Control by Intelligence Techniques

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Abstract:--

MPPT control is an important feature to extract the maximum solar power. It varies depending on the angle of sunlight on the surface of the panel and cell temperature .Maximum power point tracking (MPPT) methods are use to get maximum output power of PV array. By tracking continuously, to get the maximum power, various intelligent methods has been proposed by various authors has got the most expected results .This paper focused on the work carried out by using different algorithms and flow chart .This study reveals that, among all intelligent methods for MPPT control ,perturb and observe (P & O) method is prominently used because of its simplicity and ease of implementation, though it gives slow response of speed and oscillations in steady state.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Detection of Asymmetrical Faults in De-Energized Distribution Feeders

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Abstract:--

To ensure a safe re-energizing of an overhead distribution feeder after it is de-energized for an extended period, a fault detection technique by controlling a thyristor based device is proposed in this paper. Most of the faults in distribution line are asymmetrical faults so this paper is proposed for identifying the faults using thyristor bridge. A controllable signal is feed into de-energized distribution feeder using a thyristor based device to generate the electrical response. The proposed method involves injecting a thyristor-generated controllable signal into the de-energized feeder. By using this technique we also check the false response due to capacitance present in the line. For that purpose we analyse the system by MATLAB simulation. will be detecting fault by observing the waveforms of current and voltages. From this current and voltage waveforms we identify the type of fault on this distribution line. The simulation results are also shown in the paper.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Review of Various Digital Controllers for Brushless DC Motor Drives

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Abstract:--

Brushless DC (BLDC) motor are now a day's becoming popular in battery operated vehicles, fuel pumps, medical equipments, printers and in many other domestic, industrial and aerospace applications because of its light weight, high operating speed and excellent speed-torque characteristics. The BLDC drive system thus with the used in such applications use conventional controllers like P, PI and PID which achieve satisfactory transient and steady state response. However the major problem associated with the PID controller is that they do not yield better transient and steady state responses under different operating conditions such as parameter variation and load disturbances. This papers gives a detail study of the various controller used for the BLDC drive system, also the usefulness and error tracking capability of the digital controller in control application is given.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Control Scheme for Wind Energy System with Fuzzy Controlled Statcom

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Mrs.V.B.Hardas., KDKCE, NAGPUR

Abstract:--

When wind farm is integrated to the power system, it has stability problem. Fixed speed induction generators require reactive power to maintain air gap flux. Reactive power equipment like Static Synchronous Compensator (STATCOM) can be used to enable induction generators recover from severe system disturbances and stabilize grid connected wind generator. These devices have ability to absorb or inject the reactive power. In this paper PI based Static Var Compensator is replaced, by the fuzzy controller in the AC voltage regulator and STATCOM has been Re-designed then we can make the comparative analysis between the PI based controller and fuzzy controller. It will help to improve the overall performance of the grid and better control of reactive power with the help of fuzzy controller.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Enhancement of Power System Performance in IEEE 14-Bus by Using Upfc

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Abstract:--

Now a days, the demand of electricity generation is increased tremendously as the utilization of it and other distributed power systems have expanded drastically. With respect to demand of power, at times, it is not possible as well as economical to set up new /transmission lines. The increment in the non-linear loads and the consumption of electrical energy in power systems tends to force the electrical power utilities to provide a large electrical power and this is the cause that this problem becoming more and more significance in power systems. Hence in electrical Power System for governing, UPFC is the most promising FACTS controller. UPFC is the versatile facts device which can provide full dynamic control of transmission line parameter, bus voltage, line impedance as well as angle, for improvement of system stability and security. In this paper, Unified Power Flow Controller is studied to improve the power flow over a transmission line in a standard IEEE 14 bus system by using MATLAB / SIMULINK. For the selected system, active and reactive power flows are compared with and without UPFC.

Keywords:--

FACTS, IEEE-14 Bus system, UPFC, Power system performance.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Smart automatic energy billing with fault detection and Power unplug system using raspberry PI

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Abstract:--

Electrical power has become indispensable to human survival and progress. The proposed security system capture information and transmit it to the relevant mail by means of the internet using Raspberry pi. Apart from efforts to meet growing demand, automation in the energy distribution is also necessary to enhance people's life standard. So there is augmented demand for Automatic Meter Reading (AMR) systems which collect meter reading automatically, and its appliance is expanding over manufacturing, viable and service environment. Design of an Electric Energy Meter for longdistance data information regarding Electricity consumption, which is based upon IoT method is proposed in . In this work, the front end is User friendly and any employee with minimum knowledge of computers can work on this software. Employees can read the meter by sitting in their office. Some broadcast protocols in wired/wireless approach were introduced so far to examine digital meters distantly at dissimilar area of India. In this scenario the utilization of existing IoT network for metering in India will be a cost effective method for all class of people. The Digital watt hour meters are IoT based meters which replaced conventional electromechanical meters. A IoT based meter is used in this to evaluate the electricity expenditure of multiple user in a suburban area. A master PC at the control centre was used to propel commands to a remote meter, which in revolve transmitted data back, using the IoT. The programming language used for developing the software is Embedded C /Assembly.

Keywords:--

IoT, AMR, digital Wattmeter, Embedded C, Raspberry Pi

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Development of Wind Power in India

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Abstract:--

India is now becoming fastest growing economy in the world. Up to some extent, country's energy or power generation also add up in its economic growth. The power is generated by renewable energy sources and non-renewable energy sources. As non-renewable sources are limited and also causes environmental problems, hence India is focusing on utilizing its renewable energy sources for power generation. There will be need of 327 GW in year 2020. In India, all the three main seasons – summer, winter and rainy season can be observed. Hence, here, renewable energy sources are adequate. Among which, wind energy has been the fastest growing renewable energy sector in India. As shown by the official assessment, India has capacity to generate up to 100,000 MW of wind energy. India stands fourth globally in wind power installation. And in this achievement, one state has contributed very much i.e. Maharashtra. In this paper, we will see wind energy industry set up in Maharashtra. Contribution of wind energy in Maharashtra's economic growth, that now Maharashtra is going to become trillion dollar economy. At the end of October 2017, the total installed wind power capacity was 32.72 GW. And now focus is on increasing wind power capacity in future.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Stability Analysis of Indirect Vector Controlled Induction Motor Drive

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Abstract:--

The effects of the induction motors parameters on stability of driving systems operating at variable frequency are analyzed in this paper with the help of conventional method using computer simulation. In this paper nyquist stability criterion method is presented. The poles and zeros of the transfer functions for the rotor speed are calculated to investigate the influences of the controller parameters and motor parameters. The drive system shows the instability for lower values of frequency. Stability of induction motor in vector control depends on parameter variation. Changes in stator and rotor resistances have effect on stability analysis of vector controlled induction motor. The indirect vector controlled induction motor is modeled and simulated using MATLAB and various results has observed to check effect on stability of the drive for changes in the parameters offering the regions of stability.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Design of Grounding System of Substation: A Comparative Study of the effects of variation of number of Earth electrodes and Grid conductor.

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Abstract:--

Grounding system has a dominant effect during the design of all substations and its design strategy needs substantial attention as it plays an indispensable role in the proper functioning of the substation. Designing of an effective grounding system is very imperative as it encompasses a great deal of personnel safety and appropriate operation of the substation equipments. In this present work, a case study of a 33/11kV substation is done using the IEEE Standards 80-2000 as a reference. The procedure for designing of the grounding system is carried out with the help of a MATLAB program. The same is then used to calculate the values of the Ground resistance, the Ground Potential Rise (GPR), the Step potential and the Touch potential. The calculations are then followed by a comparative analysis of the effects of increase in the number of electrodes and/or the ground rods on ground resistance, ground potential rise, step potential and touch potential.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

A Comprehensive Research of Wireless Charging Lane for Electric Vehicles

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Dr. Mrs. A.Sudha., Shree Rajashree Mulak College of Engineering, Nagpur

Abstract:--

In this paper a brief study of wireless charging lane is presented. Electrical vehicle dynamic charging by wireless power transfer is becoming prevalent. This new power supply mode allows running cars to be charged with electricity at any time on the road. This charging is done on the basis of inductive coupling theory. Various types of wireless transfer methods are compared. Problems arising in the wireless power transmission are also discussed and optimal design for wireless charging for power maximization is also presented.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Improved Hybrid Power Generation By Artificial Neural Network

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Abstract:--

Hybrid power generation is the need of hour. Solar power and wind power are the best available non-conventional energy sources. To extract the maximum electrical power from these sources at various atmospheric conditions intelligent algorithm is the solution. This paper presents improved hybrid power generation by using artificial neural network. ANN provides improved power generation by improving the maximum power point tracking of sun and with available wind in atmosphere. In this paper an adaptive control using perturb and observe method is proposed. Neural network controller gives the enhance and improved power output. Operational analysis is carried out by using MATLAB Simulink.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

A Secured Remote Health Monitoring System Based on IoT

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Abstract:--

The Personal Healthcare Devices (PHDs) measure vital signals of patient. The advantages of PHDs are: (1) wearable (2) Support diseased people (3) Continuous monitoring of health and precaution leads to increased lifetime. Due to the advent of different communication standards such as low power Bluetooth, zigbee, and Internet of Things, the PHDs could be connected to caretakers or doctors and provide proper advice or medication. This project deals with designing a firmware for PHDs, which is interoperable and secure. The advantages of the proposed system are:

- i. Low cost PHDs could be designed compatible for the firmware
- ii. Ensures privacy
- iii. Improves patient care

There exists a challenge in terms of maintaining privacy of patient's data when connecting PHDs to the network. In this work, we integrate PHDs with internet for sharing health data using Constrained Application Protocol (CoAP) and AES algorithm for Security purpose. CoAP is based on the Representational State Transfer (REST) model and can be considered a real enabler for Internet of Things (IoT). IoT is characterized by an interconnected set of individually addressed and constrained devices in a distributed system, with sensing/active devices for physical phenomena, data collection, and applications using sensing, computation and actuation.

Keywords:--

Personal Healthcare Devices(PHD), Constrained Application Protocol(CoAP), Representational State Transfer(REST), Internet of Things(IoT), Advanced Encryption Standard(AES)

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Comparative Analysis of BLDC Motor and Induction Motor using MATLAB / Simulink

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Abstract:--

This paper proposes a comparative analysis of the performance of BLDC motor and induction motor. The BLDC motor can act as an alternative for traditional motors like Brushed DC motor, induction motor, switched reluctance motors etc. Due to over-weighing merits of the BLDC motor, modeling is done in order to enhance the performance of the system. The torque characteristic of BLDC motor present a very important factor in design of BLDC motor drive system, so it is necessary to predict the precise value of torque, which is determine by waveform of back EMF. After development of simple mathematical model of the three phase BLDC motor with trapezoidal waveforms of back EMF the motor is simulated in the MATLAB/Simulink environment. Based on analysis, a comparative study of result of both the motors is presented in Graphical User Interface of MATLAB environment.

Keywords:--

BLDC motor, Induction motor, Torque , back emf, Matlab.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Review Paper on Hybrid Power Generation Using Perturb & Observe (P&O) Algorithm

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Abstract:--

The sun and wind based generation are well considered to be alternate source of green power generation which can mitigate the today's power demand issues. Study reveals that a supervisory control unit, designed to execute Maximum Power Point Tracking (MPPT), is introduced to maximize the simultaneous energy harvesting from overall power generation under different climatic conditions. In Photovoltaic system, Perturb & observe (P&O) algorithm is used as MPPT control & Hill Climb Search (HCS) algorithm is used as MPPT control logic for wind power system in order to maximize the power generated. This research paper provides a concise yet comprehensive critical analysis of these techniques with an in-depth review of their strengths and drawbacks. This review is unique as it offers such a complete investigation of MPPT control using P&O algorithm in PV-Wind hybrid power generation. Therefore, this research paper can serve as a precise reference for the future research on MPPT for PV-Wind power generation system.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Modelling and Simulation of TSR for Compensation Of Reactive power in Transmission Line

Shubham Ashok Wakde., Electrical Engineering, KDK College Of Engineering, Nagpur, India.

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Abstract:--

For the development and improvement of dynamic performance of the modern power system, Flexible AC Transmission Systems (FACTS) devices have been used since 1970s. FACTS devices use power electronic components to improve system performance. It is also necessary to operate power system with minimum loss in the transmission line. Flexible AC Transmission System (FACTS) devices play an important role in controlling power and enhancing the usable capacity of existing lines. FACTS devices use power electronic component to enhance controllability and increase power transfer capability.

This paper present, modelling and simulation of Thyristor Switched Reactor (TSR)-Based Static VAR Compensator (SVC), which is one of Flexible AC Transmission Systems (FACTS) controllers. The effects of TSR-Based SVC on load bus voltage are simulated on MATLAB environment. The results show that significant improvement on reactive power compensation and bus voltage regulation could be achieved by using the TSR-based SVC.

TSR Simulink model consist of three units single phase units which are connected in delta connection. Each TSR unit consist of anti-parallel connections of two thyristors in series with the inductor (L) the output waveform of TSR are seen or displayed on the Scope. We can compare the results of faulty and healthy condition of transmission line.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Power theft prevention using smart meter with GSM techniqu

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Abstract:--

Electricity theft is a major concern for the utilities. With the advent of smart meters, the Frequency of collecting house hold energy consumption data has increased, making it possible for advanced data analys is, which was not possible earlier. In developing countries like India, power theft is one of the most prevalent issues which not only cause economic losses but also irregular supply of electricity. It hampers functioning of industries and factories, due to short age of power supplied to them. It causes short age of power supply to homes. It leads to loss of revenue by Government as individual enterprises may opt to install their own power generators, increases corruption in form of bribes and many more. Ultimately it is the country's economy which suffers along with the country's political reputation. We introduced here a GSM technique which gives proper power consumption mass age in the end of month

Keywords:--

Electricity power theft, advent, generators, corruption, and power consumption

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Study of Different Inverter Topologies

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Resham P Tondare., Asst Prof, Dept. of electrical engineering, KDK College of Engineering, Nagpur.

Abstract:--

We know that nowadays inverters are in huge demand and various type of inverters are already available. This paper deals with different inverter topologies such as 1- Φ H-bridge inverter, 3- Φ 3-leg inverter, 3- Φ 3-leg split capacitor inverter. DC power can be converted into AC power at desired output voltage and frequency using power electronics circuit known as inverter. There are many topologies of inverter depending on the combination and orientation of switches. The different topologies of inverter are provided to obtain optimum output, reducing the losses and cost.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Protection of Distribution Feeder using Directional Overcurrent Elements

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Abstract:--

Distribution system holds a very significant position in the power system since it is the main point of link between bulk power and consumers. It usually has radial configuration and has unbalanced operation. Distribution system protection includes selection of equipment and settings, placement of equipment, and coordination of devices to clear faults with as little impact on customers as possible. Equipments in distribution protection consist of fuses, reclosers and sectionalizers. The main priorities are to prevent further damage to utility equipment, as little of the system is taken down as possible, reliability and power quality. The problems associated with protection devices operation and coordination requires special review since they may affect the system security and dependability. In order to avoid misoperations in the system, directional elements are needed to be added. Non-directional relays may not provide sensitivity and security for faults on remote points of the circuit. Directional supervision is necessary to set overcurrent pickups with adequate sensitivity for remote faults. Here, an effort is proposed to protect distribution feeder using directional overcurrent elements

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Determining Optimum TMS and PS of Overcorrect Relays Using Big M method

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Abstract:--

The time of operation of overcurrent relays (OCRs) can be reduced and at the same time coordination can be maintained, by selecting the optimum values of time multiplier setting (TMS) and plug setting (PS) of OCRs.

This paper presents formulation of the problem of determining optimum values of TMS and PS of OCRs as a constrained nonlinear optimization problem, and solution of the same using big – M (penalty) method, which is a method used to find optimum solution of linear programming problem (LPP). This method introduces artificial variables in the objective function to get initial feasible solutions (IBFS). Artificial variables are removed using iterative process which leads to an optimal solution.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Impedance(Z) Source Inverter For Three Phase Induction Motor

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Abstract:--

This paper represent the impedance source inverter for adjustable speed drive(ASD). Utilization of ZSI in industrial applications greatly increases the reliability by allowing only lower inrush current, lower harmonic injection and high immunity to EMI noises. This limitation can be overcome by Z Source Inverter, With the use of impedance source network .The impedance network connected between rectifier and inverter circuit, act as storage during input voltage, higher than required voltage and provide string voltage during input voltage is less than required voltage. by controlling shoot through duty cycle impedance source can be produce required ac voltage even greater than line voltage. As a result this impedance source system, provides, capability during voltage sag and swell, reduce harmonic, improve power factor and reliability, and extent the output voltage, analysis simulation and experimental result can be analyzed.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Power Generation Using Magnetotactic Bacteria.

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Abstract:--

Magnetotactic bacteria (MTB) have the unique ability to generate electricity, it has magnetic particles surrounded by a biomembrane to form the magnetosome organelle. Magnetotactic bacteria have the magnetic properties which can be used in several biotechnological applications. Magnetotactic bacteria (MTB) have biomineralize intracellular nanoparticles of magnetite (magnetosomes). This unique characteristic of MTB can be used to generate electricity by means of Faraday's Law of Electromagnetic Induction. This paper discuss the possibility that MTB can potentially be used to convert mechanical energy to electrical energy, using the principle of Electromagnetic Induction.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Water Purification Using Solar Power Ultraviolet System

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Tejaswini Lodhe., K.D.K.College of Engineering, Nagpur

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Abstract:--

This paper discusses the design and construction of a solar powered water purification system. An ultraviolet water and extensively treated in several stages in large plants to ensure safety .Water is commonly filtrated, sometimes treatment system is designed and built to demonstrate the capability of the grid water treatment. The system is specifically designed for the destruction of bacterial contaminants and to meet the needs of a family of four in third world countries. Only sunlight is required to power the purification system. The provision of clean water is an important issue to solve and there is no one solution, thankfully different areas have different problems and resources and no one solution can be applied to all. In developed countries, water is often pumped from a nearby lake or from ground a water in several stages with chemical added to completely eliminate the smallest particles of pollutants and to speed up the process .Chemicals are then filtered out again .The focus of this paper will be on smaller, household system for purification water, looking at existing appropriate technology for purifying water in developing countries.

Keywords: --

photovoltaic panel, ultraviolet bulbs, pumping system, UV tank, settling and Storage tank.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Review and Study Paper of Conductors Used In Transmission, Distribution and High Power Appliances

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Abstract:--

Electrical energy forms a key factor in the development of a nation. Electricity cannot be stored and needs to be transmitted to the load center from the generation site. For transmission and distribution of electricity, conductors play a major role. This paper deals with study of different types of conductors and underground cables used in transmission and distribution systems along with electrical cables used in high power appliances. The paper reviews aluminium conductors and cables, important electrical and mechanical parameters and properties are discussed.

Key Words:--

Transmission conductor, Distribution conductors, Underground cable, High power appliances.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Solar Power Auto Irrigation System

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Abstract:--

This paper proposes a model of variable rate automatic microcontroller based irrigation system. Solar power is used as only the source of power to control overall system. Sensors are placed on paddy field and these sensors continuously sense the water level and give the message to the farmer informing the water level without visiting the paddy fields. This system consists of solar powered water pump along with an automatic water flow control using a moisture sensor. This paper proposes a model of automatic microcontroller based irrigation system. This system reduces the cost and increases productivity.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Power Quality Enhancement By Using Hybrid Filter :A Review

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Abstract:--

When the non-linear load is linked to the distribution system, it acts as a source of power quality problem which affects the performance of distribution system. This complication is increasing day by day. Hence power quality enhancement is important in the power system. To overcome the power quality issue and in order to enhance the power quality several topologies of filter are adopted. This paper is intended to review on hybrid filter for power quality enhancement and different control techniques of the active filter. This hybrid filter is based on the series topology which consists of three phase non-linear load and connecting the active filter (AF), passive filter (PF) in series and in parallel respectively at the point of common coupling (PCC), for the power quality enhancement of the distribution system. The series active filter forces to flow the harmonics in the passive shunt filter, due to this, harmonics eliminates and also it compensates the reactive power. The advantage of this strategy is that the series active filter rating is reduced in between 3% to 6%. This paper presents very appropriate solution for harmonics mitigation and compensation of reactive power using series hybrid filter topology.

Keywords:--

Hybrid filter, Series active filter, Passive shunt filter, Power quality enhancement

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Control of Speed of Two Phase Induction Motor

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Abstract:--

A motor is controlled according to the requirements of load. This requires an adjustment of proper torque and speed. The current paper discusses a relationship between speed and the flux which is required for the control of two phase induction motor. A very new technique is proposed in this paper i.e. ASFC method for controlling the flux.

Keywords:--

ASFC, Two phase induction motor, V/F, control.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Analysis Implementation & Design of Optimized High Speed FIR Filter

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Abstract:--

. This paper proposes the analysis & implementation of FIR Filter using low power adder and multipliers. The ever increasing market segment of portable electronics devices demands the availability of low power building blocks. With the explosive growth in Laptops, portable personal communication systems and evaluation of the shrinking technology and flexible circuits, the efforts in low power micro electronics has been identified. In this scheme the function of adder is minimized by a technique called scaling and rounding-off Filter coefficient and truncation of unnecessary bits in order to reduce the power consumption of FIR Filter. Evaluation of power, area and speed for different types of adders and multipliers is carried out and the FIR filter is designed with optimized combination of adders and multipliers for low power and high speed application. The Full Adder designed with multiplexers do not exhibit any leakage problems and short circuits problems. The current trend towards low-power design is mainly driven by two forces, the growing demand for long-life autonomous portable equipment and the technological limitations of high- performance VLSI systems. The proposed Design of High Speed FIR Filter for DSP Application with Optimized Adder & Multiplier is simulated using Active HDL and implemented using Tanner tool.

Keywords:--

FIR filter, Tanner Tool Adder, Multiplier, MAC

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Performance Analysis of a Hybrid Filter Composed of Passive and Active filter with Active Damper Controller

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Mrs. Krupali Sur., Department of Electrical Engineering, K.D.K. College Of Engineering, Nagpur

Asst Prof. Nikhil Khobragade., Department of Electrical Engineering, K.D.K. College Of Engineering, Nagpur

Abstract:--

This Paper Deals with the Reduction of Harmonics in Transmission System. Harmonic frequencies in power system are frequent cause of power quality problem, hence it is very essential to eliminate the harmonic content in system this paper so for the removal of harmonic content using various combination of Active and passive Filter controlled by Active Damper Controller. The main harmonic source is the non-linear load which takes discontinuous current and inject harmonics further causing unnecessary losses in the transmission network. The results show that the active damper can become a promising approach to stabilizing the future power electronics based power systems, the simulation work is also carried out in MATLAB to compare the result without or with hybrid filter

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Maximum Power Harvesting of Solar Energy by using novel control of DC-DC Converter

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Abstract:--

Nowadays the energy crises are due to the limited fossil fuel on the earth. Solar energy is continuous source of renewable energy. Solar energy has main advantages is that clean, maintenance free and space limited area compare to the other type of renewable energy which can be space consuming. One of method to improve the efficiency of photovoltaic system by using intermediate power processor which changes the current and voltage levels such that maximum power can be extracted.

In this project, we analyze the design and simulation of the electrical operation of a photovoltaic (PV) system. Photovoltaic energy are used as renewable energy system. Photovoltaic (PV) cells are used to generate dc voltages and given to DC-DC converter. Designing of converter gives constant output. DC-DC converter used as Buck type of converter. The converter output is given to battery. Buck converter gives constant output which controlled by PWM controller and feedback control system. A maximum power point tracking (MPPT) algorithm technique is used to track the peak power to maximize the produced energy. This algorithm will identify the suitable duty cycle ratio in which buck converter should operate to maximum point. The MPPT algorithm is important in increasing the efficiency of the system.

Keywords:--

component; formatting; style; styling; insert (key words)

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Fault Section Estimation Based on Neural Networks and Continuous Genetic Algorithm

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Abstract:--

Fault section estimation plays a significant role in the process of restoring the power system to its normal state in minimum time. In this paper, an approach involving artificial neural networks and genetic algorithm has been used for performing fault section estimation. We have presented a procedure to formulate objective function using neural networks and continuous genetic algorithm. This objective function is then minimized with the help of continuous genetic algorithm and fault section is identified. To validate the efficient performance of the approach, the method is tested on various systems and provides accurate results in all cases. One illustration has been presented in detail. The results show that the said approach can find the solutions effectively even in multiple fault scenarios and in case of failure of protective devices.

Keywords:--

Fault section estimation, Artificial neural network, Continuous genetic algorithm.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Implementation of Piezoelectric Tiles to Generate Electricity

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Nehal Nawkhare., Department of Electrical Engineering, DBACER, Nagpur

Utkarsha Jamodkar., Department of Electrical Engineering, DBACER, Nagpur

Aniket Banayat., Department of Electrical Engineering, DBACER, Nagpur

Niket Bhole., Department of Electrical Engineering, DBACER, Nagpur

Nishant Ade., Department of Electrical Engineering, DBACER, Nagpur

Abstract:--

Many researchers on developing new energy sources are being actively conducted recently. These new energy sources include renewable energy sources such as solar, wind, rain or wave energy and harvesting energy, especially from human activities. In this research paper, we developed energy harvester by using human footstep among various sources of energy. The generation of electric energy when some load is applied on the sensors either in the form of direct strain or ambient vibration depends upon various factors such as transducers, number of piezoelectric, electromechanical coupling coefficient of the piezoelectric sensors, amount of load applied and also on the scheme of arrangement. The model design and testing were purely for studying the energy generation and capturing phenomenon inefficient manner.

Keywords:--

Piezoelectric energy harvester, Renewable energy, Rectifier

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

On Design and Development of Pulse Generator for Electrochemotherapy

Dr. N. K. Kishore., Professor, Department of Electrical Engineering, IIT Kharagpur.

Abstract:--

Electrochemotherapy (ECT) is an efficient local tumor treatment based on the permeabilization of cell membrane due to electroporation combined with the local or systemic administration of low dose cytotoxic drugs. The technique uses intensive electric fields having high voltage for short duration to momentarily increase the cell permeability, through which the anticancer drugs can easily diffuse inside the cell membrane before it recovers its impermeability. The two most commonly used drugs are bleomycin (non permeant) and cisplatin (poorly permeant) which do not freely cross the intact cell membrane and directly affect the nuclear DNA structure with increased efficiency interfering with mitosis leading to cancer cell death. ECT in general today can be considered as a palliative option for cancers for which standard treatments (e.g. radiotherapy, chemotherapy, and surgery) have failed or proved to be insufficient. The tumors most frequently treated with ECT are skin melanoma, sarcomas & carcinomas, as well as breast cancer chest wall recurrence, head and neck cancer. Currently the technology is being developed for treatment of larger, deep-seated tumors such as liver or bone metastases. We design and develop a pulse generator used for ECT. The design have variable pulse amplitude i.e. voltage up to 700 V and variable pulse duration of 20 μ s to 20 ms with pulse frequency of 1 Hz to 5k Hz. First, simulation of the design was done in Multisim 14.0, a simulation software from National Instruments. After analyzing the waveforms obtained, circuit was implemented on bread board (Elvis) and the waveforms obtained from both the simulation and hardware were observed. Then final circuit implemented on Printed Circuit Board (PCB). Developed pulse was used to observe the change in pH, temperature and resistance of different fruit juices such as lemon, orange and citrus limetta (sweet lemon) before and after the pulse exposure. The electric pulse used for the treatment of ECT is characterized as, 8 square wave pulses of amplitude over distance ratio 50 V/cm to 1300 V/cm and duration of 100 μ s at repetition frequency of 1 Hz or more recently 5k Hz. ECT has advantages that are high effectiveness on tumors with different histology, simple application, minimal side effects and the possibility of effective repetitive treatment.

Keywords:--

Electroporation; Electrochemotherapy; Bleomycin; Cisplatin; High voltage; Square wave pulse.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Smart Grid: Technologies and Challenges

Dr. Sanjay Dambhare., Professor, Department of Electrical Engineering ., College of Engineering, Pune.

Abstract:--

The Smart Grid uses the available state of the art technologies for monitoring, analysis, control, and communication of the electrical power system to maximize the efficiency, reliability, quality and economy of the system while reducing the energy consumption. The smart grid is required to be self-healing and resilient to system anomalies. For allowing pervasive control and monitoring of the system, the smart grid is emerging as a convergence of information technology and communication technology with power system engineering.

At distribution level, Smart Grid takes advantage of clean and green power generation technologies, plug-in hybrid electric vehicles, distributed generation, solar energy, smart metering, lighting management systems, distribution automation, and many more. In recent past, micro and nano-grids are also emerging rapidly to trap the dispersed available generation so as to meet the local requirement. Because of influence of power electronics based conversion, dc grids are gaining the attention of researchers.

To allow ubiquitous control and monitoring, execute state estimation and take control decisions in real-time, WAMS plays an important role. Wide Area Measurement System consists of synchrophasor technology, information tools, communication and operational infrastructure that enable the planning, operation and monitoring of large electric power systems. In recent past, WAMS is explicitly designed to enhance the operator's real-time "situational awareness", which is necessary for safe and reliable grid operation. In addition to this, WAMS also provides support for post-event analysis of the significant system disturbances.

The applications of WAMS are power system monitoring and warning, managing wide area disturbances and power system event analysis, ensuring a suitable balance between the security and dependability of protection, system and component model validation, line parameter and state estimation. The time stamping allows the measurement to be combined easily and phase angle measurement to be made using a common reference with the help of PMU.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Dynamic Modeling and Analysis of a Self Voltage Regulating Three Phase Self-Excited Induction Generator

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Abstract:--

Dynamic modeling and analysis of a selfvoltage regulating, short shunt three-phase selfexcited induction generator (SEIG) is undertaken in this paper. The derived d-q model of SEIG is implemented in terms of a simulation model to carry out its performance analysis under no-load and loading conditions. To assess the performance for a practically viable operation, the resistive-inductive (RL) load of 0.9 lagging power factor is considered for assessing SEIG performance. In order to establish the veracity of proposed analysis the simulated results are experimentally verified.

Index terms –

Six-phase SEIG; self-excited induction generator; RL load; short shunt; SEIG test rig

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Performance Analysis of RZ Modulation for Long Haul Single Mode Fibre

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Dr. Mahmudul Alam., Department of Electrical and Electronic Engineering, University of Asia Pacific, Dhaka, Bangladesh

Md. Moshir Rahman., Department of Electrical and Electronic Engineering, University of Asia Pacific, Dhaka, Bangladesh

Muhammad Ahad Rahman Mia., Faculty of Engineering, University of Nottingham. UK, Malaysia China.

Abstract:--

In this paper, performance of RZ (Return to Zero On-Off Keying) modulation was investigated in WDM (Wavelength Division Multiplexing) based Single Mode Fibre (SMF). The simulation was done by the Industrial Software OptSIM for 40Gbit/s. Three different length of Single Mode Fibre (90 km, 180 km, 270 km) were chosen for 4 and 16 channel WDM and the length of Dispersion Compensated Fibre was fixed accordingly. For each number of channel, fibre span was varied in accordance with the lengths mentioned above. The BER (Bit Error Rate) was estimated for the best as well as the for the worst channel scenario. Analysing '4 Channel WDM' simulation, rapid increase of BER was observed for "RZ-OOK" as it increased from 10^{-9} to 10^{-8} . "RZ-OOK" continued to show poor result as its BER was ranged from 10^{-6} to 10^{-4} for 16 channel. Therefore, it was concluded that for long haul transmission in SMF, RZ showed moderate performance both in 8 and 16 Channel WDM.

Index terms –

RZ, WDM, SMF, BER.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

International Conference on Advances & Practices in Electrical Engineering

Nagpur, Maharashtra, 08th & 09th March, 2018

Development of Design Criteria of High Voltage Expansion Connectors Depending On Current and Temperature Distribution

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Abstract:--

High voltage energy transmissions to minimize the energy losses are made. The connection of high voltage networks, control and supply are made of the most important places where substations. Using this equipment in the field that allows you to move along with the increasing of voltage and high currents, some problems arise. This problem is especially of the currents and the temperature distribution of the materials through the distribution of the material leads to energy losses and hence unavailable about the lack of proper efficient. They also continue to threaten the security of the system. Substations expansion connectors are planned to be developed within the scope of this study aims to reduce energy losses and vulnerabilities as much as possible. In this study, criteria for determining the optimal expansion connector dimensions in accordance with the relevant regulations have been developed and tested for energy sustainability and production ease. As a result, the required connector dimensions and manufacturing conditions have been improved to make the current and temperature distribution uniform.

Index terms –

High current, high voltage, energy transmission, expansion connector.

08th & 09th March 2018

ICAPE – 18

ISBN: 978-81-937041-1-0

Organized by:

KDK College of Engineering, Nagpur

And

Institute For Engineering Research and Publication (IFERP)

