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National Conference on 'Renewable Energy, Smart Grid and Telecommunication-2023

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NATIONAL CONFERENCE



ON

"RENEWABLE ENERGY, SMART GRID AND TELECOMMUNICATION -2023" (NCRST-2023)

ISBN NO: 978-93-83060-28-3

13th & 14th October 2023



ORGANIZED BY

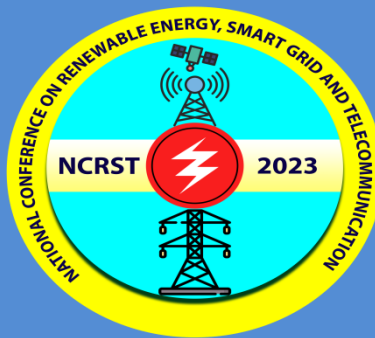
DEPARTMENT OF EE,EEE & ECE

Gandhi Institute of Excellent Technocrats (GIET)

Ghangapatana, Bhubaneswar, Dist: Khurda, Odisha, Pin: 752054



**GANDHI INSTITUTE OF EXCELLENT TECHNOCRATS
GHANGAPATNA, BHUBANESWAR
ODISHA**



**NATIONAL CONFERENCE
ON
“RENEWABLE ENERGY, SMART GRID AND
TELECOMMUNICATION – 2023”
(NCRST-2023)
(13TH & 14TH OCTOBER)**

ORGANIZED BY:

**DEPERTMENT OF EE, EEE & ECE
GIET, GHANGAPATNA, BHUBANESWAR**

CONFERENCE COMMITTEE



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Dr. Rama Narayan Sabat, Vice Chairman
Smt. Minakshi Panda, Secretary

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Prof. Shaktinarayana Mishra
Prof. Pujashree Panigrahi
Prof. Debapriya Nilakantha Padhy



About the Institution...

Gandhi Institute of Excellent Technocrats (GIET), Ghangapatana, Bhubaneswar under the flagship of Gandhi Group of Institutions (G.G.I) is an AICTE approved institute established in the year 2009. The B.Tech, MBA and MCA programs of the institute are affiliated to Biju Patnaik University of Technology, Odisha and the Diploma Programme is affiliated to State Council for Technical Education and Vocational Training, Govt. of Odisha, Bhubaneswar. The institute is set up by Venkateshwar Educational Trust and is being managed by distinguished Governing Council members comprising senior executives from Academics and Industries. The Institute works with a mission to provide quality education of international standards for producing technocrat sand future leaders in a disciplined and conducive environment as an integral part of our societal commitment to promote education globally. It was started with an intake of 240 students in four branches with a motto of providing quality engineering education in a highly disciplined environment. In less than a decade it become a citadel of engineering education having 1080 intake with 7 B. Tech. Courses and 2 PG courses i.e. MBA and MCA. It has been regarded as Modern Gurukul by the students, alumni, faculty and all distinguished visitors for its learning environment, faculty, infrastructure and the facilities.

About the Departments...

The Department of Electrical Engineering was established in the year 2009. The electrical engineering department typically offers a bachelor's degree in electrical engineering, as well as master's and doctoral degrees. The undergraduate program provides students with a foundation in the basic principles of electrical engineering, such as circuit analysis, electromagnetics, and power systems. The graduate programs offer more specialized training in areas such as power electronics, telecommunications, and embedded systems.

Electronics & Communication Engineering deals with the electronic devices, circuits, communication equipment like transmitter, receiver, integrated circuits (IC). It also deals with basic electronics, analog and digital transmission & reception of data, voice and video (Example AM, FM, DTH), microprocessors, satellite communication, microwave engineering, antennae and wave progression. It aims to deepen the knowledge and skills of the students on the basic concepts and theories that will equip them in their professional work involving analysis, systems implementation, operation, production, and maintenance of the various applications in the field of Electronics and Communications Engineering.

The department of Electrical and Electronics Engineering aims at producing qualified engineers in the areas of electronics, communication engineering, signal processing and instrumentation. The field of electronics and communication is advancing at a very rapid pace. Digital electronics has taken the center stage in every area be it computer, microprocessor or communications. The department is well equipped with a group of highly qualified and dynamic teachers. It boasts of laboratory facility to be one of the best in the state. The students are encouraged and motivated to take up challenging projects. Summer training, industrial visit and projects are carefully planned for the students to remain updated with the technology trend. Seminars and short courses are regularly organized to update the students with the latest in the education and industry trends.



About the Conference...

Theme of the Conference:

“The challenges and opportunities of integrating renewable energy into the grid”

The National Conference on Renewable Energy, Smart Grid, and Telecommunication - 2023 is a platform for industry experts, researchers, and policymakers to come together and explore the latest advancements and challenges in the fields of renewable energy, smart grids, and telecommunication.

Conference Highlights:

- ❖ In-depth discussions on renewable energy technologies and innovations.
- ❖ Smart grid integration for a sustainable future.
- ❖ The role of telecommunication in advancing renewable energy solutions.
- ❖ Networking opportunities with industry leaders and experts.
- ❖ Presentation of cutting-edge research papers and case studies.

Conference topics:

- 📖 Renewable Energy Technologies and Innovations
- 📖 Smart Grid Development and Implementation
- 📖 Telecommunication for Energy Systems
- 📖 Energy Storage and Grid Balancing
- 📖 Policy, Regulation, and Market Dynamics
- 📖 Environmental and Social Impacts of Renewable Energy
- 📖 Energy Transition and Future Outlook
- 📖 Integration of renewable energy into the grid
- 📖 Microgrids and decentralized energy systems
- 📖 Grid cybersecurity and data analytics
- 📖 IoT and sensor technologies for energy monitoring
- 📖 Data management and analytics in energy sector
- 📖 Battery storage technologies and applications



CHIEF GUEST:

- ❖ Dr. Ajit Kumar Panda
Vice President, Engineering RF
VVDN Technologies
IEEE EDS Distinguished Lecturer

KEY NOTE SPEAKER:

- ❖ Dr. Ashok Kumar Tripathy
Ex-Director General, CPRI
- ❖ Dr. Bijayananda Patnaik
Asso. Prof., ECE, NIT, Raipur
- ❖ Dr. Prakash Kumar Ray
Asso. Prof., EE, OUTR, Bhubaneswar
- ❖ Dr. Chandrasekhar Perumalla
Asst. Prof., EE, IIT, Bhubaneswar
- ❖ Dr. Pradyut Kumar Biswal
Asst. Prof., IIIT, Bhubaneswar
- ❖ Dr. Chittaranjan Naik
Asso. Prof., SENCE, VIT, Vellore, Tamil Nadu

Message from Chief Patron...



DR. SATYA RANJAN PANDA
CHAIRMAN
GIET, GHANGAPATANA, BBSR

I am extremely pleased to know that the Department of Electrical Engineering, Electrical and Electronics Engineering and Electronics and Communication Engineering of GIET, Ghangapatana is organizing “National Conference on ‘Renewable Energy, Smart Grid and Telecommunication-2023’ on 13th and 14th Oct 2023.

I understand that the large number of researchers have submitted their research papers for presentation in the conference and also for publication. The response to this conference from all over India is most encouraging. I am sure all the participants will be benefitted by their interaction with their fellow researchers and engineers which will help for their research work and subsequently to the society at large.

I wish the conference meets its objective and confident that it will be a grand success.

With regards
Dr. Satya Ranjan Panda
Chief Patron, NCRST-2023

Message from Chief Patron...



**ER. RAM NARAYAN SABAT
VICE CHAIRMAN
GIET, GHANGAPATANA, BBSR**

I hope this message finds you well. I am delighted to announce our institution's upcoming National Conference on “Renewable Energy, Smart Grid and Telecommunication-2023” scheduled to take place from 13th & 14th of October. As the Vice Chairman of our Institution, I am truly excited about this significant event that reflects our commitment to academic excellence and sustainable development.

This conference will serve as a platform for the researchers to face the different challenges and opportunities of integrating renewable energy into the grid. It is an opportunity for us to showcase our institution's dedication to advancing knowledge and contributing to the betterment of society.

As esteemed members of our faculty, your participation is instrumental in making this conference a success. I encourage you to consider submitting your research papers, proposing sessions, and actively engaging in discussions during the event. Your expertise and contributions will undoubtedly enrich the conference and help us achieve our goals.

Together, we can make this National Conference a platform for meaningful discussions, as Communication and collaboration at this conference will drive the innovation needed to make renewable energy and smart grids accessible to all.

A handwritten signature in blue ink, appearing to be 'R. Sabat'.

**Best regards,
Er. Ram Narayan Sabat
Chief Patron, NCRST-2023**

Message from Chief Patron.....



**ER. MINAKSHI PANDA
SECRETARY
GIET, GHANGAPATANA**

It is indeed a memorable day that a two day on “National Conference on Renewable energy, Smart grid and Telecommunication– 2023” on Oct 13-14 , 2023 is being organized by the Department of Electrical Engineering, Electrical and Electronics Engineering and Electronics and Communication Engineering at GIET, Ghangapatna to achieve the well-defined purpose of setting up an important landmark successfully by way of utilizing the activities consisting of expert lectures from exceptional achievers and presentations of researchers in relevant areas in an atmosphere of healthy interaction and sharing.

As we face growing concerns about environmental sustainability, energy efficiency and the need for reliable communication networks, this conference shall provide an invaluable platform for collaboration, knowledge sharing and innovation.

I am highly grateful to the members of the team for exercising painstaking effort in making this conference successful.

Minakshi Panda

**Thank you
Best regards,
Er. Minakshi Panda
Chief Patron, NCRST-2023**



Message from Patron.....



**DR. SUBHRAJIT PRADHAN
PRINCIPAL
GIET, GHANGAPATANA**

*I am pleased to announce that our Institution will be hosting a “ **National Conference on Renewable Energy , Smart Grid and Telecommunication – 2023**”, which is scheduled to take place from 13th & 14th of October. This event represents an excellent opportunity for our academic community to contribute to the advancement of knowledge in this critical field.*

The conference aims to bring together experts, researchers, and industry professionals to discuss the latest trends, innovations, and best practices in Renewable Energy and optimizing Smart Grids and enhancing Telecommunication. It will serve as a platform for exchanging ideas and fostering collaborations that can have a lasting impact on our industry.

I encourage all faculty members to actively participate in this conference by submitting research papers, organizing sessions, and engaging in meaningful discussions. Your contributions will undoubtedly enhance the quality and significance of this event.

Thank you for your dedication to advancing knowledge and promoting sustainable practices in our field. Let us work together to make this National Conference a memorable and transformative experience for all involved.

**Thank you
Best regards,
Dr. Subhrajit Pradhan
Patron, NCRST-2023**

MESSAGE



DR.CHANDAN KUMAR SAHOO.
DEAN R&D
GIET, GHANGAPATANA

Dear Esteemed Colleagues,

I am delighted to extend a warm welcome to all participants of the “*National Conference on Renewable Energy, Smart Grid, and Telecommunication-2023*”. It is with great anticipation and excitement that we gather here to explore the latest advancements in these critical fields that hold the key to a sustainable future. Our world is facing unprecedented challenges related to energy sustainability, climate change, and the increasing demands on our power grids. The convergence of renewable energy sources, smart grid technologies, and telecommunications solutions offers a promising pathway towards a more resilient and eco-friendly future.

This conference serves as a platform for experts, researchers, and innovators to share their knowledge, exchange ideas, and collaborate on solutions that will shape the energy landscape of tomorrow. Through your contributions and discussions, we aim to not only identify emerging trends but also foster partnerships that will drive meaningful change. I encourage you all to actively engage in the sessions, participate in discussions, and network with fellow professionals. Together, we can accelerate the transition to clean, efficient, and intelligent energy systems that benefit society as a whole.

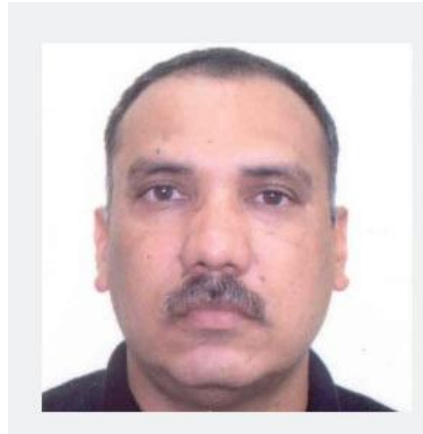
I would like to express my gratitude to the organizing committee, sponsors, and all those who have worked tirelessly to make this event possible. Your dedication to advancing these crucial fields is commendable. Let us make the most of this conference to inspire, innovate, and ignite progress in the realms of renewable energy, smart grids, and telecommunications. I look forward to the insightful presentations and fruitful conversations that will undoubtedly emerge from this gathering.

Chandan Kumar Sahoo

Thank you
Best regards,
Dr Chandan Kumar Sahoo
Advisory Committee, NCRST-2023



Message from Chief Guest...



Dr. Ajit Kumar Panda
Vice President, Engineering RF
VVDN Technologies

I am glad to know that GIET is conducting a conference in multi discipline in the name of NCRST to encourage the students, staff and faculty of different organization to work on multi discipline areas. It is the need of the time to work inter disciplinary and I think is a good step for the researchers and Technocrats of the state of Odisha as well as the country. Hope, the outcome of this conference show the path to participants to work in multi discipline and do a great job. Wish all the best.

Dr. Ajit Kumar Panda
Vice President, Engineering RF
VVDN Technologies
IEEE EDS Distinguished Lecturer

Message from Convenor



Warm Welcome to the National Conference on Renewable Energy, Smart Grid and Telecommunication-2023.!!



**PROF. BTM NAYAK
(CONVENOR, NCRST-2023)
DEPARTMENT OF ELECTRICAL ENGG.**

Dear Esteemed Delegates,

As the convener, I believe that our collective knowledge and passion for these fields have the potential to drive transformative change. Throughout the conference, we shall get the chance to explore groundbreaking research through paper presentations and panel discussions, connect with fellow delegates and experts to foster collaboration, gain insights from renowned keynote speakers who are pioneers in their respective domains, participate in workshops and sessions designed to enhance your skills and understanding.

Our aim is not only to disseminate information but also to inspire action. Together, we can identify solutions to complex challenges, accelerate the adoption of renewable energy sources, create more efficient smart grids, and enhance global telecommunications networks. Your active participation is crucial in making this conference a success. Let's work together to harness the potential of renewable energy, smart grids, and telecommunications for a brighter and more sustainable future. Once again, welcome to this exciting journey of knowledge sharing and collaboration. Let's embark on this endeavor with enthusiasm and dedication to make a meaningful impact on our world.

I wish the National Conference on Renewable Energy, Smart Grid and Telecommunication (NCRST- 2023) all success.

**Prof. BTM Nayak
(CONVENOR, NCRST-2023)**

Message from Co-Convenor



PROF. SHAKTI NARAYANA MISHRA
(CO-CONVENOR, NCRST-2023)
DEPARTMENT OF ECE

Dear Distinguished Delegates,

It is with great pleasure that I extend a heartfelt welcome to each and every one of you to the National Conference on Renewable Energy, Smart Grid, and Telecommunication. As the convener of this monumental event, I am honored to have the privilege of hosting an assembly of such accomplished professionals, researchers, and visionaries in these vital fields. Your presence here reflects your commitment to advancing knowledge, driving innovation, and addressing the pressing challenges of our time.

Throughout this conference, you will be immersed in a dynamic atmosphere of intellectual exchange, collaboration, and discovery. From this conference we can gain inspiration from esteemed keynote speakers who have made significant contributions to the fields we are passionate about, connect with fellow delegates, forge new partnerships, and exchange ideas that can spark innovation, participate in hands-on workshops and sessions designed to enhance your skills and practical understanding. The knowledge you share and the connections you make have the potential to shape the trajectory of renewable energy, smart grids, and telecommunications on a global scale. Once again, welcome to the National Conference on Renewable Energy, Smart Grid, and Telecommunication. Let's seize this opportunity to inspire, innovate, and make a positive impact on the world.

Prof. Shaktinarayana Mishra
(CO-CONVENOR, NCRST-2023)

MESSAGE FROM ORGANISING COMMITTEE



Prof. Ajanta Priyadarshinee
Asst. Professor
GIET, Ghangapatana

Eminent Conference Attendees,

A warm and enthusiastic welcome awaits you at the National Conference on Renewable Energy, Smart Grids, and Telecommunications. This gathering marks a pivotal moment in our ongoing journey to tackle the critical challenges and seize the opportunities within these vital fields. We are thrilled to witness the convergence of experts, researchers, academics, industry leaders, and innovators who are eager to contribute their knowledge and insights. Your participation not only enriches the dialogue but also propels the progress of renewable energy, smart grid technologies, and telecommunications.

Our dedicated organizing committee has thoughtfully crafted a comprehensive program encompassing cutting-edge research, practical applications, and industry trends. This broad spectrum of content aims to provide a fertile ground for robust discussions, idea generation, and meaningful collaborations. In addition to the presentations, we have arranged networking opportunities, panel discussions, and interactive sessions to facilitate dynamic exchanges and forge valuable connections. We urge all attendees to actively engage in these activities to fully benefit from the conference experience. We extend our heartfelt gratitude to our sponsors, partners, and volunteers whose unwavering support has been instrumental in bringing this event to life. As we embark on this enlightening journey of exploration and knowledge sharing, we aspire to inspire each of you not only to gain valuable insights but also to leave with a renewed commitment to shaping a sustainable future.

Together, let us work towards a world powered by clean energy, intelligent grids, and seamless communication. We eagerly anticipate the lively discussions and collaborative endeavours that will help define our shared path forward for the betterment of society.

Prof. Ajanta Priyadarshinee
(Organizing Committee, NCRST-2023)



Prof. Kumar Dasarathi Dalai
Asst. Professor
GIET, Ghangapatana

Respected Conference Participants,

We extend a heartfelt welcome to the National Conference on Renewable Energy, Smart Grid, and Telecommunication. Your esteemed presence adds significant value to this event, uniting experts and forward-thinkers dedicated to advancing these pivotal domains. Our faculty members, distinguished experts in their respective domains, have worked diligently to create a platform that facilitates the exchange of cutting-edge research, innovations, and insights. Their expertise and leadership have been invaluable in shaping the direction of our institution's contributions to sustainable energy solutions and technological progress.

Our meticulously crafted program encompasses state-of-the-art research, practical applications, and industry insights, engage actively in networking, panel deliberations, and interactive forums to fully leverage the opportunities presented. Our profound gratitude goes out to our sponsors, collaborators, and devoted volunteers whose unwavering support has made this event a reality. Let this gathering ignite inspiration and foster collaboration as we collectively strive for a sustainable future, characterized by clean energy, intelligent grid systems, and seamless communication.

Prof. Kumar Dasarathi Dalai
(Organizing Committee, NCRST-2023)



Prof. Pritam Mishra
Asst. Professor
GIET, Ghangapatana

Esteemed Participants of the National Conference on Renewable Energy, Smart Grid, and Telecommunication, We proudly extend our unequivocal support and admiration for the esteemed faculty members who have been instrumental in orchestrating this landmark event. Their tireless commitment to organizing this conference underscores their dedication to advancing the fields of renewable energy, smart grids, and telecommunications. As educators, mentors, and researchers, they stand at the forefront of knowledge, driving progress and innovation. We wholeheartedly endorse and back their efforts in organizing this conference, confident in their ability to ensure its success. We encourage all participants to actively engage with our esteemed faculty members, as they offer a wealth of knowledge and inspiration. Our gratitude extends to the organizing committee, sponsors, and participants for their collaborative contributions to this momentous event. Let us collectively recognize and celebrate the pivotal role our faculty plays in shaping the future of renewable energy, smart grids, and telecommunications.

Prof. Pritam Mishra
(Organizing Committee, NCRST-2023)



Prof. Rashmi Ranjan Martha
Asst. Professor
GIET, Ghangapatana

We are delighted to take a moment to recognize the outstanding commitment and tireless efforts of a key member of the organizing committee for the National Conference on Renewable Energy, Smart Grid, and Telecommunication. Their unwavering dedication to the success of this conference has been truly exceptional. As an integral part of our team, they have played a vital role in orchestrating every aspect, from program development to logistical coordination, ensuring the seamless execution of this event. Their passion for advancing the realms of renewable energy, smart grids, and telecommunications shines brightly in their work. Their leadership and expertise have been invaluable in shaping the conference's direction and content. We encourage all participants to seek them out during the event, as they are a valuable source of insights, guidance, and support. Their commitment to fostering meaningful connections and facilitating productive discussions is commendable. Our heartfelt appreciation goes out to this dedicated committee member, without whom this conference would not have been possible. Let us unite in expressing our gratitude for their unwavering dedication to our shared objectives.

Prof. Rashmi Ranjan Martha
(Organizing Committee, NCRST-2023)



Prof. Pujashree Panigrahi
Asst. Professor
GIET, Ghangapatana

We are thrilled to shine a spotlight on another exceptional member of our organizing committee for the National Conference on Renewable Energy, Smart Grid, and Telecommunication. Their unwavering dedication to this conference's triumph has been truly outstanding. As a vital part of our team, they have played a pivotal role in meticulously planning and executing various aspects of this event, ensuring its seamless execution. Their fervor for advancing renewable energy, smart grid, and telecommunications is palpable in their work. Their leadership and expertise have been pivotal in shaping the conference's direction, content, and accomplishments. We encourage all participants to engage with them during the event, as they are a treasure trove of knowledge, support, and guidance. We extend our profound gratitude to this dedicated committee member, whose tireless efforts have immensely contributed to our shared success.

A handwritten signature of Prof. Pujashree Panigrahi in black ink on a light blue background.

Prof. Pujashree Panigrahi
(Organizing Committee, NCRST-2023)



Debapriya Nilakantha Padhy
Asst. Professor
GIET, Ghangapatana

It gives me immense pleasure to write this message for the National Conference on National Conference on Renewable Energy, Smart Grid, and Telecommunication. It is with great pleasure that I extend a heartfelt welcome to all of you. Our committee has devoted endless hours to assemble experts, researchers, and visionaries in these vital fields. We are enthusiastic about creating an environment for discussions, collaborations, and knowledge exchange that will shape the future of renewable energy, smart grids, and telecommunications. Throughout this conference, we encourage you to actively participate in sessions, network with fellow attendees, and explore the latest developments. Your collective contributions will drive progress and innovation in these crucial sectors. Our sincere gratitude goes to our sponsors, partners, and dedicated volunteers who have been instrumental in making this event a reality.

Prof. Debapriya Nilakantha Padhy
(Organizing Committee, NCRST-2023)

Message From Resource Person...



Prof. Dr. Ashok Kumar Tripathy
Ex-Director General, CPRI

I am happy that GIET has taken initiative in conducting a National level conference on Renewable Energy and Smart Grid. These two areas address the latest concern for power network management and clean energy delivery for a smooth energy transition to a more sustainable alternative has become global priority and every citizen has a responsibility towards this. The academic Institutions are gearing up to introduce the subject to the students at an early stage. For doing justice to the subject a right dose of exposure to the Industry is necessary. Smartness refers to smart and fast communication, on line, real time sensing and correction, moving in step with technology and over all a better value for money to the stakeholder. I am also grateful to be invited as a resource person for this conference. I thank the organizers for giving me the opportunity to share my thoughts on this theme with the students, engineers and fellow researchers.

I wish the conference great success.

Prof. Dr. Ashok Kumar Tripathy
Ex-Director General, CPRI



Message From Resource Person...



***Dr.Chitta Ranjan Nayak
Associate Professor
VIT,Vellore,Tamil Nadu***

It is heartening to note that Gandhi Institute of Excellent Technocrats (GIET), Ghangapatna, Bhubaneswar is organizing a National Conference on Renewable energy, Smart Grid and Telecommunication(NCRST-2023). This event aims to bring together experts and thought leaders in these pivotal fields to exchange knowledge, insights, and innovations. I appreciate the efforts of the GIET team for organizing such an innovative and appropriate theme for the conference. As we all know that Renewable energy, smart grids, and telecommunication play crucial roles in addressing various global challenges and have significant importance in today's world.

I am also honored to be invited as a resource person for this conference. I thank the organizers for giving me the opportunity to share my thoughts on this theme with the students, engineers and fellow researchers. I wish you all good luck and hope the event become successful with the opportunity to learn from each other.

***Dr.Chitta Ranjan Nayak
Associate Professor
SENSE,VIT,Vellore,Tamil Nadu***



Message From Resource Person...



Dr. Prakash Kumar Ray
Associate Professor, EE
OUTR, Bhubaneswar

I would like to express my gratitude to the organizing committee and I welcome all the delegates for the National Conference titled “Renewable Energy, Smart Grid and Telecommunication- 2023” on 13th and 14th October 2023 at GIET, Ghangapatna, Bhubaneswar, Odisha. This Conference mainly focuses on utilizing renewable energy that reduces dependence on fossil fuels, increasing energy security and reducing vulnerability to fuel price fluctuations and supply disruptions.

Integrating renewable energy into the power grid is crucial for balancing supply and demand, improving grid stability, and reducing reliance on fossil fuels. Telecommunication networks connect people and organizations worldwide, bridging geographical and cultural divides. This conference provides a unique opportunity for us to come together, learn from each other, and collectively explore innovative solutions to some of the most pressing challenges in our fields.

I wish you all good luck and hope the event become successful with the opportunity to learn from each other.

Dr. Prakash Kumar Ray
Associate Professor
Department of Electrical Engineering,
OUTR, Bhubaneswar



Message From Resource Person...



Dr. Chandrasekhar Perumalla

Associate Professor

SES, IIT Bhubaneswar

I am happy to learn that Gandhi Institute of Excellent Technocrats(GIET),Ghangapatna, Bhubaneswar is organizing a National Conference on Renewable Energy, Smart Grid and Telecommunication-2023 on 13th and 14th October 2023(NCRST-2023). As we aim to foster insightful discussions and share expertise in these critical fields, we would be honored to have you as a resource person and a contributor to this prestigious event.. Your insights and perspectives will undoubtedly enrich the discussions and contribute to the advancement of these vital sectors.

This conference has been timely organized on a very relevant theme of the society. Therefore, I appreciate the efforts put forward by GIET to organize this conference. I am also happy to be invited as a resource person for this conference.

Dr. Chandrasekhar Perumalla
Associate Professor
SES, IIT Bhubaneswar

Message From Resource Person...



Dr. Pradyut Kumar Biswal
Associate Professor
ECE, IIIT Bhubaneswar

It gives an immense pleasure to note that Gandhi Institute of Excellent Technocrats (GIET), Ghangapatna, Bhubaneswar is organizing a National Conference on Renewable energy, Smart Grid and Telecommunication(NCRST-2023). This event aims to bring together experts and thought leaders in these pivotal fields to exchange knowledge, insights, and innovations. Telecommunication enables real-time voice communication through traditional telephone networks and modern VoIP (Voice over Internet Protocol) services.

The telecommunication networks employ encryption and security protocols to protect data privacy and prevent unauthorized access. Telecommunication networks transmit vast amounts of data, supporting internet access, emails, file sharing, and multimedia content. I am genuinely looking forward to the event's proceedings and the chance to collaborate with such a dynamic and knowledgeable group of individuals. Thank you once again for inviting me to be a part of this remarkable event.

Dr. Pradyut Kumar Biswal
Associate Professor
ECE, IIIT Bhubaneswar

Message From Resource Person...



Dr. Bijayananda Pattnaik
Associate Professor
ECE , NIT Raipur

I am glad to learn that Gandhi Institute of Excellent Technocrats(GIET),Ghangapatna, Bhubaneswar is organizing a National Conference on Renewable Energy, Smart Grid and Telecommunication-2023 on 13th and 14th October 2023(NCRST-2023). The proceedings represent scholarly work of advanced and innovative thinkers and educators from around the world. It is felt that it is only through the exchange of information that one can hope to keep up with the rapidly changing world around us. I wish all the delegates, a great educational and informative experience at the conference.

I strongly believe that this conference will provide tools and knowledge to overcome significant problems appearing in our industry and society by identifying innovative ideas and technologies introduced by the researchers and students.

I believe that events such as this one play a vital role in fostering innovation and progress. They bring together diverse perspectives, enabling us to learn from one another, challenge our assumptions, and explore new horizons. It's an honor to witness the dedication and passion of everyone involved.

Dr. Bijayananda Pattnaik
Associate Professor
ECE , NIT Raipur

INVITED TALK

GRAPHENE BASED THZ ABSORBERS

Dr.Chitta Ranjan Nayak

Associate Professor, VIT, Vellore, Tamil Nadu

Email : chittaranjan.nayak@vit.ac.in

Abstract

Graphene is a two-dimensional crystal composed of single-layer of carbon atoms in hexagonal lattice. It has thickness of 0.34 nm and exhibits excellent optical, electrical, and mechanical properties. The optical properties include nearly uniform absorption in terahertz to infrared window. The electrical features include tunable electrical conductivity, zero bandgap, cone-like band structure, high charge carrier mobility. The spaced graphene are very much important aspects in THz science including multiple narrow band absorber, broadband absorber and completely switchable absorber. The multiple narrow band absorber can be design with a single monolayer graphene with appropriate position a stack whereas the for broadband absorber design more number of graphene have to employed. A super broadband THz absorber is design with the help of differential evolution optimization algorithm.

Keywords: Graphene, Terahertz, Absorption, Tunable, THz imaging

INVITED TALK

THE ROLE OF SMART METERS IN MODERN GRIDS

Prof. Dr.Ashok Kumar Tripathy

Ex-Director General, CPRI

Email: tripathy.1948@gmail.com

Abstract

The talk is based on how the concept of Smart Grid emerged and progressed, and how subsequently a number of similar smart concepts have been added. As Long As the volume of electricity generation was low, and demand was moderate, the connectivity issues were manageable and greenhouse gas emissions from thermal power plants were grumbled but tolerated. The demand increased and the inter-connectivity issue surfaced resulting in frequent blackout problems. In order to strengthen the network, lines could be added to improve the reliability, in order to improve control, it had to have the necessary automation and observability, thirdly in order to improve its dynamic response, it had to have a smart two way communication and necessary adaptability. A name 'Smart Grid' was coined to put the new features together. Introducing smart meters in the sector was the starting point. As things progressed load dispatch centers at State, Regional and National levels were integrated. Of late the need for resiliency of the system in the abnormal situation of operation, an efficient market model and integrated operation with Distributed Energy Resources have been added as additional Smartness features.

The talk would include how an all round smartness effort has been working towards a seamless transition towards a global energy transition.

Keywords: Smart Grid, Energy Transition, Reliability, Automation, Dynamic Response

INVITED TALK

SMART GRID- FUTURE ELECTRIC GRID

Dr. Chandrasekhar Perumalla

Assistant Professor, SES, IIT Bhubaneswar

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Abstract

Considering the necessity and criticality of the Smart Grid infrastructure in the country, this talk briefly introduces the concepts of Smart grid, the way it is different from conventional grid, conceptual differences and similarities of different Smart grids envisaged across the globe, features of Smart grid and the Challenges in realizing it. We shall also discuss how Smart Grids optimize the allocation of resources, ensuring that electricity generation and distribution are efficient and responsive to varying demand. In addition this talk also briefs how the microgrid with advanced communication and control features can be a building block of the future smart grids. Finally, the talk concludes by discussing a way forward for fast and sustainable realization of Smart Grid.

Keywords: *Smart Grid, Microgrid, Conventional Grid, Grid Challenges, Sustainability*

INVITED TALK

POWER QUALITY AND STABILITY ASSESSMENT IN MICROGRID

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Abstract

A novel transformation technique based on combined AC and DC grid-based hybrid microgrid and electric vehicle operation is proposed to offer better power quality and power reliability operation. To produce constant wind speed, a novel wind speed generation method is proposed by using a 10 kW rating-based constant ventilation fan. Due to the suggested AC-DC hybrid microgrid approach, the conversion device requirement is reduced during the direct integration of EV and the battery energy storage device. In addition to that, an adequate centralized energy management control structure is proposed by combining wind power control, battery storage, and EV power control, and coordinated inverter control respectively, to offer excellent parallel action of numerous wind plants and inverters without needing extra voltage and frequency controller. Further, to reduce the computational burden, a novel transformation having the capability to handle both three-phase unbalanced voltage and current components which can be applied through a vector representation in a novel d'-q' revolving frame. The system developed undergoes different test system conditions as a failure of one inverter and sudden addition of wind plant during varying EV conditions and varying non-linear/unbalanced load demand at the shutdown conditions of wind power generation. From the study, it is found that with the presence of 19.96% non-linear load, the improvement percentage of utility, top, and bottom inverter is 97–98%, 96–97%, and 99% respectively. In addition to that, the transformation-based grid current results are compared with the traditional instantaneous power theory-based grid current results and found that significant harmonic percentage improvement results are achieved with the presence of the same non-linear load condition. Further, the proposed method takes minimum time i.e., only two to three cycles to settle the power fluctuation during transient conditions. As the above limits are well within the IEEE-1541 and IEEE 1547–2018 and offer faster settling time, then it can be suggested for real-microgrid test systems to achieve better power quality and reliability.

INVITED TALK

ENERGY EFFICIENT TECHNIQUES FOR CHIP DESIGN

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Abstract

The chip can be designed using various methodologies. Either ASIC design or FPGA design is used based on the application and various factors. Research on the trading-off between performance and energy efficiency is always a hotspot in VLSI design. Especially, Moore's law continuously allows more and more computational blocks to be integrated into a single die, which largely increases area efficiency. However, overloaded computations obviously challenge the noise margin in the design of digital VLSI and so increase the switch current in each data path, which is the main part boosting both dynamic power dissipation and power density.

VLSI designers have used circuit speed as the "performance" metric. Large gains, in terms of performance and silicon area, have been made for digital processors, microprocessors, DSPs (Digital Signal Processors), ASICs (Application Specific ICs), etc. In general, "small area" and "high performance" are two conflicting constraints. The IC designers' activities have been involved in trading off these constraints. Power dissipation issue was not a design criterion but an afterthought. In fact, power considerations have been the ultimate design criteria in special portable applications such as wristwatches and pacemakers for a long time. The objective in these applications was minimum power for maximum battery life time.

In order to optimize the power dissipation of digital systems low-power methodology should be applied throughout the design process from system-level to process-level, while realizing that performance is still essential. During optimization, it is very important to know the power distribution within a processor. Thus, the parts or blocks consuming an important fraction of the power are properly optimized for power saving.

Many advanced techniques are used to reduce the dynamic power component at several levels of design. Lowering the power supply voltage while maintaining the performance is one of the technique for power reduction. Also, It has been observed that low-power techniques at the high-level (algorithmic and architectural) of the design lead to a power saving of several orders of magnitude.

INVITED TALK

GREEN PHOTONICS: TRENDS AND OPPORTUNITIES

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Abstract

Green technology is known as environmental friendly technology or clean technology. It is used to monitor the design of systems to conserve the natural environment and resources, and to curb the negative impacts of human involvement. It is also used to describe sustainable energy generation technologies such as solar energy, wind turbines etc. In the present and next generation, very high system capacity and network coverage is expected. More bandwidth is needed for Real time video conference, Image transmission, Communication for everyone at any time and place, Human to machine and machine to machine interaction. Photonics is the science of light (photon) generation, detection, and manipulation through emission, transmission, modulation, signal processing, switching, amplification, sensing etc. Most photonic applications are in the range of visible and near-infrared light. Photonics developed as an outgrowth of the first practical semiconductor light emitters invented in the early 1960s and optical fibers developed in the 1970s. With the rapid growth of wireless communication networks, energy consumption is also increasing at a fast rate. In order to provide improved data rate and better quality of service, service providers have led to a matter of concern over energy efficiency. Optical systems require very less energy and provides very huge bandwidth; thus are widely accepted technology. Researchers conclude that mobile operators are among the top energy consumers. The energy efficiency of 5G networks is 100 times that is from 10mW/Mbps/sec to 1000mW/Mbps/sec. With the increasing energy cost and power consumption, wireless communication has led to various environmental problems. Thus, for the sustainability of these technologies, green technology is a must.

NCRST-2023

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A BRIEF STUDY ON INTEGRATION OF RENEWABLE ENERGY INTO THE GRID

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ABSTRACT

The integration of renewable energy into the grid is a critical aspect of transitioning towards a more sustainable and environmentally friendly energy system. Renewable energy sources, such as solar, wind, and hydropower, offer numerous benefits including reduced greenhouse gas emissions and long-term energy security. However, their intermittent nature and geographic dispersion pose significant challenges to grid operators. To address these challenges, grid integration strategies focus on enhancing the flexibility and resilience of power systems. This involves the development of advanced grid management technologies, energy storage solutions, and demand-side management programs. Smart grids play a pivotal role in real-time monitoring, control, and optimization of energy flow, enabling seamless integration of renewables. Moreover, regional and cross-border grid interconnections facilitate the sharing of renewable resources across diverse geographical regions, reducing the impact of intermittency. Policy incentives, regulatory frameworks, and market mechanisms are also vital in promoting renewable energy adoption and ensuring a level playing field for all market participants. In conclusion, the successful integration of renewable energy into the grid demands a holistic approach encompassing technological advancements, regulatory support, and international cooperation. This transition not only reduces our reliance on fossil fuels but also paves the way for a more sustainable and resilient energy future.

KEYWORDS:-*Renewable Energy sources, Advanced grid management technologies, Energy storage solutions, Demand-side management programs.*

FLY ASH FROM THERMAL POWER PLANTS – WASTE MANAGEMENT AND OVERVIEW

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ABSTRACT

Coal-fired thermal power plants in developing countries, such as India, provide a significant portion of their energy needs. However, the disposal of solid waste, particularly fly ash, has become a major environmental concern. Fly ash, which constitutes 80% of coal ash and is very fine in nature, is typically collected by electrostatic precipitators. In India, around 90 million tons of fly ash is generated annually, contributing significantly to environmental pollution.

In contrast, developed countries like Germany have successfully utilized 80% of their fly ash, whereas in India, only 3% is put to use. This article aims to highlight the importance of managing fly ash effectively as a way to both reduce environmental pollution and harness the potential of this solid waste for environmental and economic benefits.

KEYWORDS: *Fly ash, particulate matter, thermal power plants, waste management.*

Paper Id: NCRST-23/03

AN OVERVIEW ON SMART GRID DEVELOPMENT AND IMPLEMENTATION

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ABSTRACT

The smart grid is a transformative advancement in modernizing the electrical grid infrastructure. It combines digital communication, sensing, and control technologies to enhance electricity generation, transmission, and consumption. Smart grids utilize real-time data for optimizing energy flow, reducing losses, and integrating renewable energy sources efficiently. Key components of smart grid development include the deployment of smart meters, providing consumers with real-time energy consumption data for better management. Grid automation and self-healing capabilities enhance resilience during outages, minimizing downtime. Integrating renewable energy sources, such as solar and wind, seamlessly into the grid is a central focus. This promotes sustainability and reduces greenhouse gas emissions. However, ensuring cybersecurity and data privacy is critical in smart grid development. Effective regulatory and policy frameworks are also essential for fair pricing and consumer access. The decentralization of the power system, automatic recovery and real time information, reducing transmission losses, digital meters and the security of the system are some of the benefits. In conclusion, the smart grid represents a fundamental shift toward a cleaner, more resilient, and technologically advanced energy future, offering improved efficiency and empowering consumers to manage their energy consumption effectively.

KEYWORDS: Smart grid development, Advanced Metering Infrastructure, Automation Renewable.

Paper Id: NCRST-23/04

ENHANCING POWER QUALITY THROUGH ADVANCE TECHNIQUES

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ABSTRACT

Power quality improvement is important in modern electrical systems to ensure reliable and efficient operation. For improve power quality we use GRID AUTOMATION, generally automation of gride operations helps utilities detect and isolate faults more quickly, reducing the duration and impact of power outages. Many countries invest in upgrading and modernizing their electrical grid infrastructure to reduce power interruptions, voltage fluctuations, and losses during transmission and distribution. Poor power quality, characterized by voltage sags, harmonics, and voltage fluctuations, can lead to equipment damage, operational disruption, and increased energy consumption. This ABSTRACT highlight the significance of power quality improvement techniques, such as active power filters, voltage regulators, and advance monitoring systems.

KEYWORDS: Active power filter; Distributed generation; Distribution static compensator; Harmonics reduction; power quality; Unified power quality conditioner.

Paper Id: NCRST-23/05

ENERGY MANAGEMENT IN HYBRID RENEWABLE ENERGY SYSTEMS

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ABSTRACT

Hybrid energy systems have emerged as a promising solution to address the challenges of sustainability, reliability, and efficiency in the field of energy generation and distribution. This abstract provides an overview of hybrid energy system that integrate both on-grid and off-grid components. Hybrid energy systems integrate multiple sources of energy generation, such as solar, wind, hydro, and fossil fuels, along with energy storage and advanced control systems to optimize energy production and consumption. By combining these diverse resources, hybrid systems can achieve higher energy yields, reduced environmental impact, and enhanced grid stability.

KEYWORDS: *Energy Sustainability, Wind Turbines, Solar-PV, Renewable Energy.*

Paper Id: NCRST-23/06

A REVIEW : 5G WIRELESS TECHNOLOGY

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ABSTRACT

5G Technology stands for fifth Generation Mobile technology. From generation 1G to 2.5G and from 3G to 5G this world of telecommunication has seen a number of improvements along with improved performance with every passing day. This fast revolution in mobile computing changes our day-to-day life that is way we work, interact, learn etc. This paper also focuses on all preceding generations of mobile communication along with fifth generation technology. Fifth generation network provide affordable broadband wireless connectivity (very high speed). The paper throws light on network architecture of fifth generation technology. Currently 5G term is not officially used. In fifth generation researches are being made on development of World Wide, Dynamic Ad hoc Wireless Networks (DAWN) and Real Wireless World. Fifth generation focus on (Voice Over IP) VOIP-enabled devices that user will experience a high level of call volume and data transmission. Fifth generation technology will fulfill all the requirements of customers who always want advanced features in cellular phones. The main features in 5G mobile network are that user can simultaneously connect to the multiple wireless technologies and can switch between them. This forthcoming mobile technology will support IPv6 and flat IP. Fifth generation technology will offer the services like Documentation, supporting electronic transactions (e-Payments, e-transactions) etc.

KEYWORDS: *5G, Millimeter wave (MMW), Multiple input and multiple output (MIMO).*

Paper Id: NCRST-23/07

SOLAR POWER GENERATION AND EFFICIENCY IMPROVEMENT TECHNIQUES

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ABSTRACT

Solar power generation is a sustainable and environmentally friendly energy source that has gained significant attention in recent years. This abstract provides a concise overview of various techniques employed to enhance the efficiency of solar power generation systems. These techniques include advanced photovoltaic cell designs, tracking systems, concentrated solar power, and energy storage solutions. The pursuit of higher efficiency in solar power generation is vital for harnessing the full potential of renewable energy sources and reducing our dependence on fossil fuels. This paper explores the key strategies and innovations in the field, emphasizing the importance of continued research and development to achieve maximum efficiency in solar power generation.

To optimize solar power systems, techniques like maximum power point tracking (MPPT), advanced solar inverters, and bifacial solar panels have been developed. Moreover, solar thermal systems and energy storage solutions are crucial for ensuring reliable energy supply, even during non-sunlight hours. Managing solar energy effectively through smart grid integration and net metering programs is essential for grid stability.

KEYWORDS: Photovoltaic (PV) cells, Solar panels, Solar Energy conversation.

Paper Id: NCRST-23/08

AN OVERVIEW ON SMART GRID DEVELOPMENT AND IMPLEMENTATION

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ABSTRACT

Renewable energy technologies and innovations are at the forefront of addressing the global energy challenge. In an era marked by environmental concerns and the need to reduce greenhouse gas emissions, renewable energy sources such as solar, wind, hydro, geothermal, and bioenergy have gained significant prominence. This abstract provides an overview of the key advancements and innovations that are shaping the renewable energy landscape. One of the notable breakthroughs in renewable energy is the rapid development of photovoltaic (PV) solar panels. Innovations in PV materials and manufacturing processes have led to increased efficiency and affordability, making solar power accessible to a wider range of consumers. Similarly, advancements in wind turbine design and materials have boosted the efficiency and output of wind farms, contributing to their growing presence in the energy mix. Energy storage technologies, such as lithium-ion batteries and emerging alternatives, play a crucial role in addressing the intermittent nature of renewable sources. These innovations enable the storage of excess energy during periods of high production for use when demand is high or renewable generation is low, enhancing grid stability. Smart grid technologies, powered by artificial intelligence and IoT (Internet of Things), are transforming the way energy is managed and distributed. These innovations optimize energy flows, minimize losses, and allow for better integration of renewables into existing infrastructure. Moreover, the decentralization of energy production through microgrids and distributed generation is empowering communities to generate their own clean energy, reducing reliance on centralized power plants. In conclusion, renewable energy technologies and innovations are driving the transition to a sustainable and low-carbon energy future. These advancements not only mitigate the adverse impacts of climate change but also foster energy security, economic growth, and environmental stewardship.

KEYWORDS: Solar power, grid integration, energy storage, wind energy.

Paper Id: NCRST-23/09

**REVIEW ON CRITICAL ANALYSIS OF HVDC IN MINIMIZING THE LOSES WITH VARYING
GENERATION PROFILE**

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ABSTRACT

High Voltage Direct Current (HVDC) transmission systems are critical elements in modern power grids, serving the overarching objective of efficient, long-distance electricity transport. The primary purpose of HVDC is to minimize transmission losses associated with Alternating Current (AC) over extended distances. This is accomplished through a multi-step process involving conversion, transmission, and re-conversion. At the sending end, AC power is converted into DC power using rectifiers. The DC power is then transmitted through dedicated cables or overhead lines with minimal losses, and at the receiving end, it is transformed back into AC power using inverters.

The outcome of HVDC transmission is a multitude of benefits. Firstly, it enhances grid reliability by allowing the interconnection of asynchronous AC grids and enabling power exchange between regions with varying power generation profiles. Secondly, it facilitates the integration of renewable energy sources, such as offshore wind farms, by efficiently transmitting their power to population centers. Thirdly, HVDC systems significantly reduce transmission losses, making electricity transmission more energy-efficient and environmentally friendly. As the world continues to transition towards sustainable energy sources, HVDC transmission systems play a pivotal role in reshaping the global energy landscape.

KEYWORDS: HVDC, Transmission systems, AC, DC, sustainable energy.

Paper Id: NCRST-23/10

BIO BATTERIES – A SUSTAINABLE POWER SOURCE FOR THE FUTURE

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ABSTRACT

A bio battery, a groundbreaking eco-friendly energy source, harnesses the power of living organisms to generate electricity. Unlike conventional batteries, which rely on chemical reactions, bio batteries employ biological processes, such as microbial fuel cells (MFCs) or enzymatic reactions, to convert organic matter into electrical energy. This innovative technology holds immense potential for sustainable energy production. In an MFC-based bio battery, microorganisms like bacteria or algae metabolize organic compounds, breaking them down and releasing electrons. These electrons flow through an external circuit, creating an electrical current. Enzymatic bio batteries, on the other hand, utilize enzymes as catalysts to facilitate electron transfer, making them efficient and versatile. Bio batteries offer several advantages, including renewable fuel sources, reduced environmental impact, and applications in remote and resource-constrained areas. As research continues to advance, bio batteries are poised to revolutionize the energy landscape, providing a clean and renewable alternative to traditional power sources.

KEY WORDS:- Bio Battery, Microbial Fuel Cells, Biomass Conversion.

Paper Id: NCRST-23/11

SOLAR BASED WIRELESS CHARGING:A SUSTAINABLE POWER SOLUTIONS

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ABSTRACT

Solar-powered wireless charging is an innovative technology that leverages solar panels to generate clean and sustainable energy for wireless device charging. This advanced system combines photovoltaic panels with wireless charging technology to create a versatile and environmentally friendly charging solution. At its core, this technology relies on photovoltaic panels to capture sunlight and convert it into electrical power. This energy can be stored in batteries or directly transmitted wirelessly to charge various devices like smartphones, tablets, and electric vehicles. The elimination of physical cords and connectors enhances convenience and flexibility. The key advantage of solar-powered wireless charging lies in its sustainability. It reduces dependency on non-renewable energy sources and minimizes carbon emissions, contributing to a greener planet. Moreover, this system is especially valuable in remote or off-grid locations where traditional power sources are scarce. Furthermore, solar-powered wireless charging promotes energy efficiency and can be deployed in diverse settings, from urban environments to rural areas. It fosters wider access to clean energy, aligning with the global push for eco-friendly solutions. This technology represents a future where the sun powers our devices, reducing our environmental impact while ensuring seamless connectivity.

KEYWORDS:- SOLAR BASED WIRELESS CHARGING, WIRELESS CHARGING TECHNOLOGIES, SUSTAINABLE POWER, PHOTOVOLTAIC PANNELS .

Paper Id: NCRST-23/12

TRANSFORMER DESIGN AND EFFICIENCY IMPROVEMENT

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ABSTRACT

The Transformer is a groundbreaking architecture in machine learning, especially for natural language processing. It's designed to understand and generate text. Instead of traditional methods that struggle with long-distance relationships in text, the Transformer uses a self-attention mechanism to capture these connections effectively. Efficiency improvements are crucial. Researchers have made Transformers faster and less resource-intensive. Techniques like BERT, which pre-trains models on lots of data, save time and data. Pruning removes unnecessary parts from models, making them smaller. Quantization reduces model precision, saving memory. Knowledge distillation transfers knowledge from a big model to a smaller one without losing much performance. Specialized hardware like GPUs and TPUs speeds up Transformer tasks. In simple terms, the Transformer is like a super-smart text robot, and these improvements make it smarter and faster, making it a valuable tool for various tasks like language translation, chatbots, and more.

Keyword:- transformer architecture, quantization, distillation, model pruning etc.

Paper Id: NCRST-23/13

FAULT DETECTION AND LOCALIZATION IN POWER GRID

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ABSTRACT

Fault detection and localization in power grids are critical aspects of ensuring the reliability and stability of electrical distribution systems. This abstract explores the challenges and methodologies involved in detecting and pinpointing faults within power grids. It delves into the importance of early fault detection to prevent cascading failures, minimize downtime, and enhance grid resilience. Various techniques, including data analytics, sensors, and machine learning algorithms, are discussed for their potential in fault detection and localization. The abstract also highlights the significance of real-time monitoring and advanced grid management systems in achieving efficient fault management. Ultimately, the effective detection and localization of faults in power grids are essential for ensuring uninterrupted electricity supply and the overall sustainability of modern electrical infrastructure.

KEYWORDS: *Power Grid, Fault detection, Grid Monitoring, Grid Fault Analysis.*

Paper Id: NCRST-23/14

UNVEILING THE POTENTIAL OF SOLAR POWER PLANTS: A CLEAN AND SUSTAINABLE ENERGY SOLUTION

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ABSTRACT

A solar power plant harnesses energy from the sun to generate electricity through photovoltaic cells or concentrated solar power systems. It plays a pivotal role in the transition towards sustainable and renewable energy sources, offering numerous environmental and economic benefits. By converting sunlight into electricity, solar power plants reduce greenhouse gas emissions, combat climate change, and decrease reliance on fossil fuels. Solar power plants consist of solar panels that capture sunlight and convert it into direct current (DC) electricity. Inverters then transform DC into alternating current (AC) for use in homes, businesses, and the grid. These facilities vary in size, from small rooftop installations to vast solar farms covering vast expanses of land. Their scalability makes solar power plants adaptable to diverse energy needs, promoting a cleaner and more sustainable energy future.

KEYWORDS: *Solar Panels, Inverter, Solar Thermal, Off-Grid Solar, Solar Tracking.*

Paper Id: NCRST-23/15

AN OVERVIEW OF BATTERY STORAGE TECHNOLOGIES AND APPLICATIONS

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ABSTRAT

Battery storage technologies play a pivotal role in the ever-evolving energy landscape, addressing key challenges such as intermittent renewable energy sources and grid stability. This abstract explores the diverse applications and promising advancements in battery storage. Battery storage technologies encompass a wide range of solutions, including lithium-ion, lead-acid, flow batteries, and emerging technologies like solid-state batteries. These systems store electrical energy efficiently and release it when needed, making them indispensable in modern energy infrastructure. One of the primary applications of battery storage is in the integration of renewable energy sources like solar and wind into the grid. By storing excess energy generated during periods of high renewable output and releasing it during peak demand or when renewables are not available, batteries enhance grid reliability and reduce reliance on fossil fuels. Moreover, battery storage finds applications in the transportation sector, powering electric vehicles (EVs) and electrified public transportation systems. This transition to battery-powered transportation contributes to reduced greenhouse gas emissions and air pollution. In addition, battery storage is increasingly used in residential and commercial settings for energy management, backup power, and peak shaving. These applications enhance energy efficiency, reduce electricity bills, and provide critical backup during grid outages. As battery technologies continue to evolve, offering higher energy density, longer cycle life, and lower costs, their applications are poised to expand further, promoting sustainable energy usage and grid resilience.

Keywords: *Battery storage, applications, technologies, renewable energy, grid stability.*

Paper Id: NCRST-23/16

INNOVATIVE APPLICATIONS OF SOLAR ENERGY

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ABSTRACT

The innovative application of solar energy has become a pivotal focus in addressing the growing global energy demand while mitigating environmental concerns. This abstract provides a glimpse into various cutting-edge approaches and technologies that harness the power of the sun in novel and efficient ways. Solar Photovoltaics: Advances in photovoltaic technology have led to the development of high-efficiency solar panels, integrated into building materials and infrastructure. These innovations are revolutionizing urban architecture and transportation by seamlessly incorporating solar energy generation. Concentrated Solar Power (CSP): Concentrated solar power systems utilize mirrors or lenses to focus sunlight, generating high-temperature heat for electricity production and industrial processes. Recent breakthroughs have improved CSP efficiency and expanded its applications.

KEYWORD: *Solar Energy, Renewable Energy, Solar Pannel, Solar Light*

Paper Id: NCRST-23/17

RENEWABLE ENERGY INTEGRATION IN ELECTRICAL GRIDS: CHALLENGES AND SOLUTIONS

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ABSTRACT

The integration of renewable energy sources (RES) into electrical grids has emerged as a critical imperative in the pursuit of a sustainable and low-carbon energy future. As the world transitions away from fossil fuels, the increasing deployment of wind, solar, hydro, and other renewable resources poses both substantial opportunities and formidable challenges to power system operators, planners, and policymakers. This abstract provides an overview of the key challenges and innovative solutions associated with the seamless integration of renewable energy into electrical grids.

In conclusion, the integration of renewable energy sources into electrical grids is a multifaceted challenge with significant environmental, economic, and technical implications. As the world accelerates its transition toward a sustainable energy landscape, addressing these challenges with innovative solutions and collaborative efforts among stakeholders will be pivotal in achieving a cleaner, more reliable, and resilient electrical grid powered by renewable energy.

Keywords :-Smart grid, Challenges, Solutions, Renewable Energy Sources

Paper Id: NCRST-23/18

AUTOMATIC STREET LIGHT CONTROL SYSTEM

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ABSTRACT

Automatic street light systems are pivotal in modern urban environments, offering enhanced energy efficiency and sustainability. This abstract explores the concept and advantages of these systems.

Automatic street light systems use various technologies, such as sensors and timers, to intelligently control street lighting. By detecting ambient light levels or motion, they ensure lights are only active when needed, conserving energy and reducing operational costs. These systems also contribute to enhanced safety by providing well-lit pathways for pedestrians and drivers.

The integration of renewable energy sources, like solar panels, further enhances their eco-friendliness. Additionally, remote monitoring and control enable real-time adjustments, minimizing maintenance efforts and costs.

In summary, automatic street light systems represent a crucial component of modern urban infrastructure, aligning with sustainability goals while providing safer, more efficient lighting solutions. Their adoption not only reduces energy consumption but also contributes to the overall well-being of urban communities.

Keyword: - Automatic, Sensors, Cost, Safety, Remote monitoring, Energy consumption, etc.

Paper Id: NCRST-23/19

A JOURNEY INTO ELECTRIC VEHICLES

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ABSTRACT

The electrification of transportation has experienced a remarkable evolution in recent years, emerging as a pivotal strategy in mitigating climate change and reducing the world's dependence on fossil fuels. This abstract provides a succinct yet informative overview of the key developments in electric vehicle (EV) technology. Electric vehicles have gained widespread recognition for their significant environmental benefits. By replacing internal combustion engines with electric motors, they reduce greenhouse gas emissions and air pollutants, contributing to cleaner and more sustainable transportation. The gradual shift towards renewable energy sources for electricity generation further enhances the eco-friendliness of EVs. One of the critical drivers of the EV revolution has been the relentless improvement in battery technology. Innovations in battery chemistry, energy density, and cost reduction have extended EV range, accelerated charging times, and made electric cars more affordable and accessible to consumers. The expansion of charging infrastructure is another pivotal aspect of the EV landscape. Rapid-charging networks and home-charging solutions have eased range anxiety and improved the convenience of EV ownership, supporting the growing market demand. Furthermore, the integration of autonomous features and connectivity into EVs is transforming the way we perceive transportation. Smart, connected EVs are paving the way for safer, more efficient, and environmentally conscious mobility solutions. This abstract serves as a foundational reference for researchers, policymakers, and enthusiasts, offering insight into the dynamic and ever-evolving world of electric vehicles.

Keywords:-Electric,Technology,Networks,Development

Paper Id: NCRST-23/20

A COMPREHENSIVE EXPLORATION OF WIND ENERGY

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ABSTRACT

Wind energy is a renewable and sustainable source of electricity generated by harnessing the kinetic energy of moving air masses. This abstract provides a brief overview of key aspects of wind energy. Wind turbines, typically comprising large rotor blades connected to a generator, are strategically positioned in areas with strong and consistent wind patterns, such as coastlines, plains, or mountain ridges. As the wind flows over the blades, it causes them to spin, converting the kinetic energy into electrical power. Wind energy offers several advantages, including its low environmental impact, reduced greenhouse gas emissions, and a virtually inexhaustible supply. It plays a crucial role in mitigating climate change and diversifying the energy mix. However, challenges like intermittency and land use conflicts must be addressed for wind energy to fulfill its potential as a clean and reliable source of electricity in the transition to a sustainable energy future.

Keywords:- Renewable energy, Wind turbine, Rotor & Generators, Climate, etc.

Paper Id: NCRST-23/21

UTILIZED THE POWER OF EVERY STEP: FOOT STEP POWER GENERATION

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ABSTRACT

Footstep power generation is an innovative energy harvesting technology that harnesses the kinetic energy generated by human footsteps to produce electricity. This sustainable and eco-friendly approach provides a renewable energy source in various applications. It typically involves piezoelectric materials or electromagnetic induction mechanisms embedded in flooring or pathways, converting mechanical pressure into electrical energy.

This abstract summarizes the concept of footstep power generation, highlighting its potential benefits, including reducing carbon footprint and powering low-energy devices. It discusses the underlying principles and materials used in this technology. Furthermore, it touches upon real-world applications such as smart cities, public spaces, and remote areas where conventional power sources are limited. Footstep power generation represents a promising solution for green energy generation and holds the potential to contribute significantly to the global push for sustainability.

Keywords -Piezoelectric, Foot step, Dc generator,Public Space.

Paper Id: NCRST-23/22

ONE STEP TO ENVIRONMENT USE OF SOLAR CAR

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ABSTRACT

A solar car is a highly efficient and sustainable vehicle powered by solar panels that capture sunlight and convert it into electricity. These eco-friendly vehicles offer a clean and renewable energy solution for transportation, reducing carbon dioxide and carbon monoxide and unwanted gasses which are unhelpful atmosphere and it also reduced the fossil fuels. Solar cars it's a development of electrical vehicle. It also we can say that it is the modification and higher version of electrical vehicle. It is the permanent solution of absence of electricity and also petrol, diesel and fossil fuels. The main advantage of developing this it can create a good and Ecofriendly environment. It can reduce costs, maintenance, noise and unwanted gasses which are more dangerous to our environment. However, challenges such as limited energy generation during cloudy days and high production costs remain. Overcoming these obstacles will require continued research and development efforts. Now a days the different types of solar car and vehicle are present in some country and some places. But, some large numbers of organizations are development this technology. The development of solar cars holds promise not only for reducing carbon emissions but also for promoting renewable energy integration into transportation. As technology advances, solar cars may become more practical for everyday use, contributing to a greener and more sustainable future for transportation.

Keyword:-Solar,Eco-friendly,Environment,Trasportation

Paper Id: NCRST-23/23

REVOLUTIONIZING ENERGY MONITORING: THE POWER OF SMART ENERGY METER

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ABSTRACT

Electricity is one of the fundamental necessities of human beings, which is commonly used for domestic, industrial and agricultural purpose. A smart meter is an electronic device that records information such as consumption of electric energy, voltage levels, current, and power factor and communicates the information to the consumer and electricity suppliers. A smart energy meter is a digital device that that measures and records electricity consumption in real-time, offering numerous advantages over traditional meters. It can communicate data remotely, enabling utilities and consumers to monitor and manage energy usage more efficiently. Real-time energy monitoring energy usage with smart energy meters, I can now monitor energy consumption in real-time. These meters provide accurate and up-to-date information on your electricity usage, empowering you to make informed decision and take control of your energy consumption.

Keywords : Smart Meter, Smart Components, Sensors, Energy, Power, Efficiency, etc

Paper Id: NCRST-23/24

ARTIFICIAL INTELIGENCE IN POWRSTATIONS

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ABSTRACT

Artificial Intelligence (AI) is revolutionizing power stations by transforming traditional energy production and management practices. In the context of power generation, AI is employed for predictive maintenance, using data analysis to forecast equipment failures and optimize maintenance schedules. AI-driven energy optimization algorithms maximize efficiency and minimize energy wastage in power stations, contributing to reduced operational costs and environmental impact. Moreover, AI's role extends to grid management, enabling the seamless integration of renewable energy sources, balancing supply and demand, and enhancing grid reliability. Demand forecasting powered by AI aids in resource planning and pricing strategies, ensuring a stable power supply. Security is another critical aspect where AI shines, as it identifies and mitigates cybersecurity threats in real-time, safeguarding essential infrastructure. Furthermore, AI plays a pivotal role in managing renewable energy variability, ensuring consistent power generation. It also enhances asset management, prolonging the lifespan and performance of power station equipment. Ultimately, AI's deployment in power stations promises a more sustainable, efficient, and secure energy future.

Keyword- Revolutionizing,Energy,Power generation,Security,Reliability etc.

Paper Id: NCRST-23/25

HYDROELECTRIC POWER GENERATION AND ITS ENVIRONMENTAL IMPACT

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ABSTRACT

Hydroelectric power generation is a renewable and sustainable energy source that harnesses the power of flowing water to produce electricity. Hydropower plants have minimal greenhouse gas emissions, making them a cleaner alternative to fossil fuel-based power plants. However, the construction of large dams and reservoirs required for hydroelectric projects can have significant environmental consequences like habitat destruction, alteration of natural river flows, and disruption of aquatic ecosystems. The construction and maintenance of hydroelectric power plants can result in deforestation, soil erosion, and increased sedimentation. The altered river flow patterns can also affect fish migration, impacting fish populations and biodiversity. To mitigate these environmental impacts, it is crucial to carefully plan and manage hydroelectric projects. Implementing measures like fish ladders, and habitat restoration can minimize the negative effects on aquatic ecosystems. While hydroelectric power generation offers numerous benefits, it is essential to balance energy production with environmental conservation to ensure a sustainable future.

Keywords:-*Hydro power,Environment,Mitigation,Eco System,Costly Infrastructure etc.*

Paper Id: NCRST-23/26

EXPLORING THE POTENTIAL OF UNDERWATER WIND MILLS

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ABSTRACT

An underwater windmill, also known as a tidal stream turbine, is a device that converts the kinetic energy of flowing water into electricity. It works in a similar way to a wind turbine, but instead of using wind to spin its blades, it uses the movement of water. Tidal stream turbines are typically installed in areas where there are strong tidal currents, such as in estuaries and narrow straits. The turbines are anchored to the seabed and their blades are positioned so that they are perpendicular to the direction of the current. As the current flows past the blades, it causes them to spin. The spinning blades turn a generator, which produces electricity. Tidal stream turbines are still a relatively new technology, but they have the potential to make a significant contribution to the global energy mix. A number of tidal stream turbines are already in operation around the world, and more are being developed. Underwater windmills, also known as tidal stream turbines, are a promising new technology for generating renewable energy. They work by converting the kinetic energy of flowing water into electricity. Tidal stream turbines have a number of advantages over other types of power generation, such as coal and gas.

Keywords -*Tidal stream turbine, kinetic energy, current, low-maintenance, predictable*

Paper Id: NCRST-23/27

RECENT DEVELOPMENTS IN ELECTRONICS DEVICES

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ABSTRACT

Wireless charging, also known as wireless (cordless) power or energy transfer, is the technology that enable a power source to transmit electromagnetic energy to an electrical load across an air gap, Means wireless power transmission involves the exchange of power without the need for physical connection (cords or wires). It means simply placing them on a special mat or "charging pad" or "charging surface" will allow both Android phones and iPhones to absorb a charge. In future, wireless charging may even buy possible just wireless just by being near a charger, means you don't have need to take your device out of your pocket to charge. It charges automatically. In wireless charging, the transmitter converts AC into a magnetic field. The device picks up the field and converts it back to AC.

KEYWORD:

Inductive charging, Magnetic Resonance, Electric Field Coupling, Radio Reception.

Paper Id: NCRST-23/28

MIXED REALITY

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ABSTRACT

Mixed reality is like blending the real world with virtual stuff to make a new, cool world. It's when you can see and interact with computer-made things in the real world, making it seem like they're really there. It's like magic goggles that bring digital things into your world. Mixed reality (MR) is a technology that blends the real world with computer-generated elements. It allows you to see and interact with virtual objects as if they exist in your actual surroundings. This combination of reality and virtuality creates immersive and interactive experiences, like wearing special glasses to see virtual creatures in your living room or using augmented reality apps that overlay digital information on your smartphone's camera view. Mixed reality is all about merging the real and digital worlds to make exciting and useful new experiences. This abstract provides a concise overview of the fundamental concept and potential of mixed reality.

Keywords:-

Virtual Reality , Augmented Reality, immersive Technology, Interaction, Digital overlay, Computing, 3D Visualization, Virtual object, Real-time Tracking, Magic Leap , User Experience, Simulation.

Paper Id: NCRST-23/29

SOLID STATE DRIVES

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ABSTRACT

Solid State Drives (SSDs) have revolutionized data storage with their rapid advancements in technology. This abstract encapsulates the SSD's essence, highlighting its key aspects. SSDs employ non-volatile memory to store data, replacing traditional hard disk drives. They exhibit exceptional speed, low latency, and durability due to the absence of moving parts. NAND flash memory, the core technology, enables efficient data access and reliability. Ongoing research focuses on enhancing storage capacities, reducing costs, and addressing potential longevity concerns. SSDs play a pivotal role in various applications, from personal computing to enterprise-level systems, reshaping the landscape of data storage.

Keywords :-

Solid State Drive, NAND Flash, Non-Volatile Memory, Data Storage, Speed, Latency, Durability, Performance, Reliability, Technology, Storage Capacity, Cost-Effective, Longevity, Data Access, Hardware.

Paper Id: NCRST-23/30

3D PRINTING

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ABSTRACT

3D printing or additive manufacturing is a versatile technology that can be used to produce customized objects on demand with minimum waste. It has the potential to change the revolution of manufacturing and create new products and services 3D printing works by depositing material layer by layer to create a three dimensional object. This process can be used to produce objects of various shapes and size, from simple things to complex functional parts. 3D printing is already being used in various industries including aerospace, automotive, medical and consumer products. For example 3D printed parts are being used in aircraft engines, car parts, dental implants and mainly in prosthetic limbs (which are made artificially that replaces a missing body parts). As 3D printing technology continues to develop, it is likely to have an even greater impact on the world. It could enable smaller businesses to compete with larger manufactures and great new products and services that were not possible before.

KEYWORD: *3D printing, Additive manufacturing, Customization, Waste reduction, Innovation.*

Paper Id: NCRST-23/31

ENERGY CONSERVATION

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ABSTRACT

The optical layer of a network is the energy-efficient technology to provision high bandwidths for data transport. Unfortunately occasional electronic processing is unavoidable in current networks. This process is much more energy-consuming than the optical transport. Recent research has already yielded great improvements in terms of energy efficiency. It is, however, observed that increased energy-efficiency typically leads to higher overall energy-consumption. Therefore it is imperative to reduce the environmental impact by additional means: maximizing the use of renewable energy. We present an approach to greenhouse gas (GHG) emission-reducing grooming by considering the heterogeneous distribution of fossil and renewable energy sources. We analyze various two step solutions for the route calculation and light-path provisioning problem in IP-over-WDM mesh networks. We show that it is possible to reduce GHG emissions at a stable level of energy consumption and improved blocking performance compared to previous energy-efficient solutions.

KEYWORDS: Optical WDM network·IP-over-WDM·grooming·GHG.

Paper Id: NCRST-23/32

RECENT DEVELOPMENTS IN ELECTRONICS DEVICE: FLEXIBLE DISPLAYS

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ABSTRACT

The popularity of portable devices with flexible and large screens is on the rise and it is important to design user interfaces that are visually appealing and user-friendly on these devices. Flexible displays are those, which can be bent or otherwise manipulated. This is in contrast to traditional displays, which are made of glass and are therefore rigid and fragile. Flexible displays are made using a variety of technologies, including organic light-emitting diodes (OLEDs), electronic paper, and liquid crystal displays (LCDs).

Advantages: increased portability and versatility.

Flexible displays have a number of advantages over traditional displays. They are more durable, lighter in weight, and thinner. They can also be perfectly curved, which opens up new possibilities for device design. Like Foldable smart phones, Roll able displays, Wearable devices, New form factors, Immersive experiences, Human-machine interfaces. Additionally, flexible displays are often more energy-efficient than conventional displays.

Conclusion:

Flexible displays are still in their early stages of development, but they have the potential to revolutionize the way we interact with our devices.

Keywords -

Flexible displays, Large-screen portable devices, Bent, Folded, Organic light-emitting diodes (OLEDs), Curved design,

Paper Id: NCRST-23/33

RECENT DEVELOPMENTS IN ELECTRONICS DEVICE: HOME AUTOMATION.

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ABSTRACT

Home Automation is the use of technology to control and monitor household devices and appliances (a device or piece of equipment design to perform a specific task). The technology is used in home to create a digital environment and can be used to control a wide range of devices such as controlling room temperature, electrical and electronics devices, security and lighting. Home automation system typically used Wi-Fi or Bluetooth to connect devices to a central hub, which can then be controlled using a Smartphone, voice assistant or other interface. The use of Wireless Sensor and Actuators Networks (WSANs) in home automation is a growing trend. WSANs are based on network architecture and protocols in order to enable a network of integrated devices which monitor and control household apparatus. As more and more devices become connected to the internet, home automation is poised to become even more widespread in the future.

KEYWORD:

Smart Home, Intelligent Home, Auto-systematic Home, Sustainable Home.

Paper Id: NCRST-23/34

BATTERY MANAGEMENT SYSTEM

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ABSTRACT

Battery management is the process of monitoring and controlling the operation of batteries to optimize their performance, lifespan, and safety. Battery management systems are used in a wide range of applications, including electric vehicles, consumer electronics, and industrial systems. BMSs perform a variety of functions, including: state estimation, protection and cell balancing, etc. BMSs are becoming increasingly important as batteries become more widely used in a variety of applications. As battery technology continues to evolve, BMSs will need to become more advanced to meet the demands of new applications. Researchers are working on new technologies to address these challenges and develop more effective and reliable BMSs. For example, new cell balancing techniques are being developed to improve the performance of BMSs in large battery packs. And new safety features are being developed to protect batteries from damage under extreme operating conditions. As battery technology continues to evolve, battery management will become increasingly important. BMSs will play a vital role in ensuring the safe, reliable, and efficient operation of batteries in a wide range of applications.

Keywords:-

State of charge (SOC), State of health (SOH), State of power (SOP), Battery prognostics, Battery diagnostics, Thermal management, Cell balancing, Battery safety, Battery recycling, Battery re-use.

Paper Id: NCRST-23/35

RECENT DEVELOPMENTS IN COMMUNICATION ENGINEERING

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Topic: A SMALL MICROSTRIP PATCH ANTENNA FOR FUTURE 5G APPLICATIONS

ABSTRACT

This paper presents a low profile microstrip patch antenna (low size antennas having low radiation) for next generation 5G devices. The proposed patch antenna has a bunch structure of 20mm*20mm*1.6mm including the ground plane, which is suitable to be used in handheld devices. The antenna creates an echo at 10.15GHz covering 5G frequency band. The proposed design provides a gain of 4.46dBi and the radiation pattern is in omni directional. In this paper geometry of the antenna and various parameters VSWR (Voltage Standing Wave Ratio) plots are presented and measured results are also presented.

KEYWORD: 5G patch antenna, High-frequency patch antenna, IoT patch antenna, Wearable patch antenna.

Paper Id: NCRST-23/36

WIND RENEWABLE ENERGY IN AGRICULTURE

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ABSTRACT

The increasing demand for food and the unstable price of fossil fuels have led to the search for environmentally friendly energy sources, such as wind and solar renewable energy systems in agricultural greenhouses. These systems reduce fuel consumption and enhance the sustainability of greenhouse production. However, fossil fuels are not sustainable sources of energy, and renewable energy systems like wind and solar can be implemented in agricultural greenhouses to meet growing demands while reducing reliance on unsustainable fossil fuels. Therefore, finding sustainable energy sources is crucial for meeting the growing food demands and enhancing sustainability in agricultural greenhouses.

Keywords : Fossil Fuels , Green House , Energy , Unstable Price , Sustainability , Renewable

Paper Id: NCRST-23/37

5G TECHNOLOGY IN MOBILE NETWORKS

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ABSTRACT

Generation (5G) Technology is a recent generation of mobile networks that offers high-speed internet for everyone anytime, anywhere. It differs from previous networks due to its novel features such as interconnecting people, controlling devices, objects, and machines. 5G mobile systems provide diverse levels of performance and capability, serving new user experiences and connecting new enterprises. Research and analysis have explored aspects such as millimeter wave (mmWave), massive multiple-input and multiple-output (Massive-MIMO), small cell, mobile edge computing (MEC), beamforming, and different antenna technology. The main aim of this article is to highlight recent enhancements made towards the 5G mobile system and discuss its future research objectives.

Keywords:- management recycling, electrical, appliance, electronic, etc.

Paper Id: NCRST-23/38

FACT DEVICES IN POWER SYSTEM

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ABSTRACT

In today's power systems, Flexible Alternating Current Transmission (FACT) devices have become key elements. They are highly sophisticated systems engineered to improve the performance, efficiency, stability, and reliability of AC transmission systems. FACT devices such as Static Var Compensators (SVCs), Static Synchronous Compensators (STATCOMs), Unified Power Flow Controllers (UPFCs), Thyristor-Controlled Series Capacitors (TCSCs), and Static Compensators FACT devices employ power electronics and advanced control algorithms in order to provide real-time control of power system parameters, delivering reliable power to customers and ensuring electricity grid reliability at the same time. The paper gives an outline of the importance of FACT devices to confront today's issues in power networks, such as their fundamental role in the modernization and enhancement of the electricity grid.

Keywords :- Thyristor, Compensators, Capacitor, Grid

Paper Id: NCRST-23/39

E-WASTE MANAGEMENT FOR ENVIRONMENTAL SUSTAINABILITY

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ABSTRACT

E-waste management in India follows a similar pattern. An informal e-waste recycling sector employs thousands of households in urban areas to collect, sort, repair, refurbish, and dismantle disused electrical and electronic products. E-Waste is a term used to cover items of all types of electrical and electronic equipment (EEE) and its parts that have been discarded by the owner as waste without the intention of re-use. "E-waste management refers to properly disposing and managing electronic waste, including old or discarded electronic gadgets such as phones, computers, and televisions. E-waste recycling is the process of extracting valuable materials after shredding the e-waste into tiny pieces that could be reused in a new electronic appliance. But a number of current challenges are preventing the electronic.

Keywords:- management recycling, electrical, appliance, electronic, etc.

Paper Id: NCRST-23/40

HOUSE AUTOMATION SYSTEM

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ABSTRACT

Drasis Automation is a leading distributor of home automation supplies. We are committed to making home automation solutions easy, effective, and affordable. At Drasis, we've partnered with over 30 automation and audio video manufacturers from across the world, supplying dealers and installers with the latest, award-winning products at the best price. Our scope of work begins with an initial consultation to suggest products and brands, depending on budget, project scope, time, etc. Professionals at Drasis Automation Company, Chennai, provide reliable solutions that match every budget. Our technical support team is always ready to provide technical and sales assistance to dealers and installers, ensuring the end user's needs are attended to promptly and effectively.

Keywords :-

Drasis Automation, project scope, supplying dealers, etc.

Paper Id: NCRST-23/41

A REVIEW ON GREEN ENERGY POTENTIALS

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ABSTRACT

Bioethanol, a renewable and sustainable energy source, is becoming a significant industry in the near future. It has become a good source of basic raw materials, and bioethanol is also becoming an important fuel blender. Biofuels, derived from biomass, are gaining attention due to oil price spikes, energy security concerns, and concerns over greenhouse gas emissions from fossil fuels. Advanced technology is being developed to use cellulosic biomass, such as trees and grasses, as feedstocks for ethanol production.. These systems include green alternative and renewable energy sources, energy carriers and conversion technologies, enforceable energy policies, feasible energy conservation and management programs, and system integration.

Keywords:-Green energy, Technology, Renewable, Energy, Sustainable.

Paper Id: NCRST-23/42

Design of Lithium Battery Management system for Electric vehicle

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ABSTRACT

The advantages of lithium ion batteries, ranging from high energy density, to high service life, make them in great demand. Along with high demand, the use of lithium ion batteries also increases in complexity, for example, the use of electric vehicles and smart grids. The requirement that lithium ion batteries be used in certain conditions, for example as a battery, must have the same voltage as a lithium ion battery if connected in series. If this condition is not met, security and battery life are at stake. Battery Management System (BMS) comes as a solution to this problem. This study aims to design a BMS with three main features: monitoring, balancing and protection. BMS is designed using an Arduino Nano microcontroller. The test results show the performance of BMS to monitor voltage values has a root mean square error (RMSE) of 0.00706 or an accuracy of 99.29%, while the average value of the relative standard deviation (MRSD) is 0.258% or a precision level of 99.74%.

Keywords :- BMS, Lithium-ion Battery, Arduino Nano, Charger, etc.

Paper Id: NCRST-23/43

PERFORMANCE FOR RENEWABLE POWER GENERATION SYSTEMS

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ABSTRACT

Renewable power sources are gaining attention as a sustainable solution to meet global energy demands and address climate change. The transition to renewable power is driven by factors like decreasing costs, technological advancements, and policy support. Integrating renewable energy into existing energy grids is crucial for a more resilient and cleaner future. Rural areas facing fossil fuel shortages and electricity shortages can benefit from decentralized renewable energy production, alleviating energy distribution problems associated with conventional sources. India, one of the world's largest renewable energy programs, is proposing to electrify all 25,000 remote villages and hamlets through renewable energy options like solar photovoltaic (SPV), small hydro, biomass, wind, and hybrid systems by 2012.

Keywords: *Renewable power, Sustainable energy, Renewable energy sources, Energy transition, Green energy, Clean power, Solar power, Wind energy.*

Paper Id: NCRST-23/44

BATTERY MANAGEMENT SYSTEM

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ABSTARCT

Now a days we need to save and store our sources for our healthy life. To store energy, we use many kinds of batteries for vehicles, electronic devices, etc. Battery is the one kind of energy storer, which stores energy in the form of chemical energy and give the electrical output. It has high energy density and low power density. For getting high energy, number of cells are connected to form a battery back. for example: lead-acid battery, Li-on battery. Battery management system is any electronic system that manages a rechargeable battery pack, such as by protecting the battery from operating its Safe Operating Area. Battery management system (BMS) is used in many industries and commercial organisations to make the battery operation more efficient, for more estimation to keep battery for a longer use and to increase battery life time. For a safe battery, Monitoring is needed, calculating secondary data and, reporting that data, controlling its environment, authenticating it, and balancing it. For large amount of energy storage, we need a number of batteries, which are connected both series and parallel. In battery bank, by using battery management system the life of the battery increases. Many monitoring techniques are used to monitor the battery state of charge, temperature and current. For this monitoring state, digital and Analog sensors with microcontrollers are used.

Keywords: *BMS, Analog sensor.*

Paper Id: NCRST-23/45

SMART CARD BASED STUDENT ATTENDANCE SYSTEM

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ABSTRACT

Managing attendance may be a vital record-keeping activity in any institution. There are different methods of maintaining the attendance from manual system where attendance is marked in sheets to automated attendance on the likes of biometrics. The combination of frequency Identification (RFID) with fingerprint biometric technology was to enhance the safety level and integrity of the records. The designed system not only makes the system design simpler but also enhances the productivity of the institution both in terms of man power and time. The system doesn't only simplify the method of taking attendance but reduces error and allows for faster verification of student attendance, all with minimal human interaction. This technique will help the authorities manage the attendance system in a more organized, efficient and time saving manner. The planning of the system is straightforward and portable making it an honest candidate for commercial and academic purpose. A GUI based version and app-based version has been designed to make the system both PC and mobile friendly. The system is built with various levels of access permissions and security. The system was tested for a small group of 100 students and was found to provide accurate marking of attendance for all users.

Keywords :- RFID Card,RFID Scanner,Finger Print Scanner, etc.

Paper Id: NCRST-23/46

AUTOMATIC SOLAR TRACKING SYSTEM (ASTS)

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ABSTRACT

The generation of power from the reduction of fossil fuels is the biggest challenge for the next half century. The idea of converting solar energy into electrical energy using photovoltaic panels holds its place in the front row compared to other renewable sources. But the continuous change in the relative angle of the sun with reference to the earth reduces the wattage delivered by the solar panel. In this context, a solar tracking system is the best alternative to increase the efficiency of the photovoltaic panel. Solar trackers move the payload toward the sun throughout the day. In this paper, different types of tracking systems are reviewed, and their pros and cons are discussed in detail. The results presented in this review confirm that the azimuth and altitude dual-axis tracking system is more efficient compared to other tracking systems. However, from a cost and flexibility point of view, a single-axis tracking system is more feasible than a dual-axis tracking system.

Keywords :- Solar, Photovoltaic Panel,Tracking System

Paper Id: NCRST-23/47

Internet Of Thinking (IOT):Challenges and Applications

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ABSTRACT

The Internet of Things (IoT) is a technological god in Information Technology, transforming real-world objects into intelligent virtual ones. It aims to unify everything in our world under a common infrastructure, providing control and information about the state of things. This study addresses IoT concepts through systematic review of scholarly research papers, corporate white papers, professional discussions, and online databases. It provides an overview of IoT architectures, technologies, and usages in daily life, aiming to provide good comprehension for new researchers and facilitate knowledge accumulation in the field of IoT. The IoT is transforming the way we interact with the Internet

Keywords :- Internet , Internet World, Information Technology

Paper Id: NCRST-23/48

DESIGN THE ELECTRICAL POWER SYSTEM OF A SOLAR ELECTRIC VEHICLE

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ABSTRACT

The paper presents an artificial neural network maximum power point tracker (M PPT) for solar electric vehicles, based on a highly efficient boost converter with insulated gate bipolar transistor (IGBT) power switch. The reference voltage for MPPT is obtained using a gradient descent momentum algorithm. The tracking algorithm adjusts the converter's duty-cycle to match the PV-module voltage at various insolation, temperature, and load conditions. A digital signal processor (DSP) is used for fast response, and a proportional-integral-derivative (PID) controller is included for improved system stability. The energy generated is used to charge the lithium ion battery stack for the solar vehicle.

Keywords : MPPT, IGBT, Solar vehicle.

Paper Id: NCRST-23/49

BATTERY MANAGEMENT FOR HYBRID ELECTRIC VEHICLES

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ABSTRACT

The battery management system (BMS) is a critical component of electric and hybrid electric vehicles. The purpose of the BMS is to guarantee safe and reliable battery operation. To maintain the safety and reliability of the battery, state monitoring and evaluation, charge control, and cell balancing are functionalities that have been implemented in BMS. As an electrochemical product, a battery acts differently under different operational and environmental conditions. The uncertainty of a battery's performance poses a challenge to the implementation of these functions. This paper addresses concerns for current BMSs. State evaluation of a battery, including state of charge, state of health, and state of life, is a critical task for a BMS. Through reviewing the latest methodologies for the state evaluation of batteries, the future challenges for BMSs are presented and possible solutions are proposed as well.

Keywords :- Battery, BMS, Charge, Electric, vehicle, etc.

Paper Id: NCRST-23/50

DESIGN FOR TRANSMISSION LINE MONITORING IN SMART GRID

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ABSTRACT

The development and implementation of a smart grid for power supply is one of the pressing issues in modern energy economy, given high national priority and massive investments, although the entire subject is still in its infancy stage. The smart grid delivers electricity from producers to consumers using two-way digital technology, and allows control of appliances in the consumers' houses and of machines in factories to save energy, while reducing costs and increasing reliability and transparency. Such a modern electricity network is promoted by many governments as a way of handling energy independence, global warming and security of supply. Smart meters are part of the smart grid, but do not themselves constitute a smart grid. A smart grid includes an intelligent monitoring system that keeps track of all the electricity that flows in the system. It could incorporate the use of super-conducting transmission lines to reduce losses, as well as the ability to integrate electricity from alternative sources such as solar and wind. When electricity cost is low, the smart grid can offer the customer to run intensive consumption household appliances, such as washing machines, or processes in plants that operate at flexible hours. On the other hand, smart grid at peak hours can, in coordination with the client, turn off selected appliances and machines to reduce demand.

Keywords :-Electricity, Grid, Reliability, Client

Paper Id: NCRST-23/51

SOLAR POWER PLANT DESIGN METHODOLOGY

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ABSTRACT

Jan Baeyens' methodology for designing concentrated solar power plants (CSPs) addresses the challenges of daily and monthly variations in solar irradiation flux. CSPs require accurate estimation of daily solar irradiation to determine optimal design and operation. The methodology uses local solar irradiation data as hourly data and direct irradiation to provide more accurate input into CSP design. The results demonstrate the potential of CSPs and define the design background of STC plants, demonstrating the importance of accurate estimation and prediction in solar energy systems.

Keywords :- Jan Baeyen , methodology, solar ,energy, plant

Paper Id: NCRST-23/52

COMPUTER & SECURITY

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ABSTRACT

Supervisory control and data acquisition (SCADA) serves as the backbone of several critical infrastructures, including water supply systems, oil pipelines, transportation and electricity. It accomplishes essential functions, such as monitoring data from pumps, valves and transmitters. Across different generations, SCADA has undergone a significant evolution from a typically isolated environment to a highly Interconnected network. Although this conversion has benefits for SCADA, such as enhanced performance Efficiency and the cost reduction of heavy equipment, it has made SCADA more vulnerable to various Cyber-attacks. Several SCADA security approaches are still provided by IT-based systems that are possibly Not efficient enough to deflect the risks and threats originating from SCADA field operations. As a result, It is critically important to analyse cyber risks associated with the industrial SCADA system. The goal of This survey is to explore the security vulnerabilities of SCADA systems and classify the threats accordingly. In this project, we initially reviewed SCADA systems from different scopes, including architecture, Vulnerabilities, attacks, intrusion detection techniques (IDS) and testbeds. We proposed taxonomies of Vulnerabilities, attacks, IDS and testbeds according to predefined criteria. We concluded the survey by Highlighting the research challenges and open issues for future research in the field of SCADA security

Keywords :SCADA, vulnerabilities, Cyber-threats Testbed, Intrusion detection Taxonomy.

Paper Id: NCRST-23/53

**MULTI-LOOP POWER CONTROL STRATEGY OF CURRENT SOURCE PWM
RECTIFIER**

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ABSTRACT

In the two phase static coordinate system, the power control strategy of the current source PWM rectifier is established based on the instantaneous power theory. This article proposes a reactive power compensation scheme based on ac side filter capacitors, which enables CSR to achieve unit power factor operation under different load conditions. In order to effectively suppress the parallel resonance generated by the LC filter on the input side of the rectifier, a capacitive voltage feedback active damping loop is introduced, and the influence of different damping gains on the system performance is analyzed in detail. The dc side outer loop is converted into a linear time invariant system, the ac and dc side power calculation process is analyzed in detail, and the entire control loop is analyzed using frequency domain method to determine the controller parameters. Finally, the correctness of the control strategy proposed in this article is verified by Malabo/Simulink simulation and experimental prototype test.

Keywords :- Current source PWM rectifier, Power control, Reactive power, response method, Harmonic analysis

Paper Id: NCRST-23/54

FLEXIBLE ENERGY RESOURCES IN ELECTRIC POWER SYSTEM

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ABSTRACT

The high penetration of intermittent renewable-based power into modern power systems increases the need for More technical ancillary services from flexible energy resources. Smart homes could provide different flexibility Services related to active power control services and therefore fulfil a part of the flexibility needs of system operators. In this regard, the estimation of the flexible capacities of each smart home's flexible device is of keyImportance. Correspondingly, this paper first estimates the flexible capacities of a smart home with controllableDevices as flexible resources. The flexible capacity of each appliance is estimated considering its flexible and nonflexible operations. Besides, the local and system-wide flexibility services are introduced and the paper discussesWhether a smart home can provide these types of services. In the simulations of this paper, the flexible capacity of each household appliance is estimated and compared to each other. Finally, the profitability of the smart home's Battery energy storage multi-use is analysed when it is providing three different types of flexibility services for the transmission system operator's needs. The results demonstrate that in some scenarios, the smart home's Battery energy storage can increase its profits by providing transmission-system-level flexibility.

Keywords :- smart homes, flexibility services, energy flexibility ,demand response controllable appliances

Paper Id: NCRST-23/55

**DYNAMIC EQUIVALENTS FOR EXCITATION CONTROLLERS AND GOVERNOR
TURBINE SYSTEMS**

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ABSTRACT

The aim of this paper is to suggest simple procedures for obtaining dynamic equivalents for generator units with excitation controllers and governor turbine systems. The equivalent parameters of various systems are derived based on the response of step input to individual systems. Equivalencing of hydro turbine systems and steam turbine systems are performed separately. For steam turbine systems, different types, reheat and nonreheat are combined to form an equivalent. IEEE Type 1 category excitation system has been considered for equivalencing. The responses and eigenvalues of the full system and that of equivalent system are compared for the validity of the method. This retains the physical identity of the system. This has potential application in planning studies.

Keywords. *Dynamic equivalents; Stability equivalents; Coherency based equivalents; Controlling unit equivalents.*

Paper Id: NCRST-23/56

WIRELESS COMMUNICATION

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ABSTRACT

Wireless communication is a vital aspect of modern society, enabling the seamless exchange of data and information without physical connections. This technology uses radio waves, microwaves, or other electromagnetic frequencies to transmit signals between devices, offering flexibility and convenience. Wireless communication has evolved significantly, from early radio broadcasts to today's advanced cellular networks and Wi-Fi systems. This abstract will explore the key features of wireless communication, such as its role in mobile phones, internet connectivity, and the Internet of Things (IoT). It will highlight the challenges associated with signal interference, security, and spectrum management. Furthermore, it will discuss the promising future of 5G technology and its potential to revolutionize wireless communication by enabling faster data speeds, lower latency, and support for a vast array of connected devices. Overall, wireless communication continues to shape our interconnected world, providing the foundation for a wide range of applications that enhance our daily lives.

Keywords : *IOT, Wireless Communication, 5G technology, Electromagnetic frequency.*

Paper Id: NCRST-23/57

PAPER BATTERY

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ABSTRACT

The Batteries form a significant part of many electronic devices. Typical electrochemical batteries or cells convert chemical energy into electrical energy. Batteries based on the charging ability are classified into primary and secondary cells. Secondary cells are widely used because of their rechargeable nature. Presently, battery takes up a huge amount of space and contributes to a large part of the device's weight. There is strong recent interest in ultrathin, flexible, safe energy storage devices to meet the various design and power needs of modern gadgets. New research suggests that carbon nanotubes may eventually provide the best hope of implementing the flexible batteries which can shrink our gadgets even more. The paper batteries could meet the energy demands of the next generation gadgets. A paper battery is flexible, ultra-thin energy storage and production device formed by combining carbon nanotubes with a conventional sheet of cellulose based paper. formed by combining carbon nanotubes with a conventional sheet of cellulose based paper.

Keywords : Nanotube, Secondary cell, Primary cell, Cellulose.

Paper Id: NCRST-23/58

ELECTRICAL POWER NETWORK CONTROL AND SIMULATION SOFTWARE

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ABSTRACT

This paper describes a power system simulation and energy management system with particular reference to operation under dynamic conditions. In order to provide continuing assistance to power system operators during network is landing and other extreme conditions it is important that the energy management software should be robust. The major functional elements of the energy management system and their relationship with the simulation system are considered. The dynamic behaviour of a medium scale power system model and associated energy management software is studied and results are presented with particular emphasis on the performance of the simulation, analysis and control algorithms during emergency conditions.

Keywords :- Computer control, Electric power systems, Optimization, Power system control, Robustness, Simulation.

Paper Id: NCRST-23/59

REVIEW ON RENEWABLE & SUSTAINABLE ENERGY

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ABSTRACT

Research on aluminium batteries is rapidly gaining momentum as a potential alternative to established battery chemistries such as lithium ion. Aluminium is abundant, recyclable, and due to its three-electron redox reaction, it offers the potential for high specific energy and power. It can also be used as a metal negative electrode due to its dendrite-free plating behaviour at relevant conditions in room temperature ionic liquid electrolytes. With these electrolytes, a battery made entirely of abundant elements can also be envisaged. However, in order to commercialise aluminium batteries, researchers must still overcome formidable challenges, because no positive electrode material has yet demonstrated efficient reversible storage of aluminium ions. This review paper provides a critical summary of the research to date. We present a discussion of the chemistry of the electrolytes, the deposition and dissolution behaviour of aluminium, and the various cathode materials that have been attempted. We also place non-aqueous aluminium batteries in context with other battery systems and provide an outlook of future research direction, and potential future applications. Using clear graphics to explain the various concepts, we intend this review to provide a broad and clear introduction to the field for researchers new to the area.

Keywords :- Aluminium Battery Ionic liquid Poly(3,4-ethylenedioxythiophene) (PEDOT) Rechargeable/secondary Sustainable

Paper Id: NCRST-23/60

REVIEW ON ALTERNATIVE FUEL VEHICLES

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ABSTRACT

Despite the improvement in technologies for the production of alternative fuels (AFS), and the needs for using more APs for motor vehicles for the reductions in air pollution and greenhouse gases, the number of alternative fuel vehicles (AFVs) in the global transportation sector has not been increasing significantly (there are even small drops for adapting some AF's through the projections) in recent years and even in the near future with projections to 2050. And gasoline and diesel fuels will remain as the main energy sources for motor vehicles. After reviewing the latest advantages and disadvantages of AFVs, including flexible-fuel, gas, electric, hybrid electric, and fuel cell electric vehicles, it is found that the higher price of AFVs, compared to that of gasoline and diesel vehicles, might be one of the main barriers for their wider adoption. But on the other hand, there is the "chicken and egg" problem. Because people mostly do not select AFVs due to their higher price and sometimes their less infra- structure availability compared to those of gasoline and diesel vehicles, however, governments and AFV's manufacturers claim that the insignificant demand volume and less interest by people to purchase them, is one of the main reasons for a higher price and less infrastructure availability of AFVs.

Keywords :- Alternative fuel and vehicle police, Alternative fuel vehicles, Clean fuel Consumer purchase intention, Environmental concern, Gasoline and diesel vehicles.

Paper Id: NCRST-23/61

MODELING ANALYSIS OF WASTE HEAT RECOVERY WITH THERMO-ELECTRIC GENERATOR

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ABSTRACT

Concepts such as the engines downsizing, stop/start systems as well as more costly full hybrid solutions and Waste Heat Recovery (WHR) technologies have been proposed in the last years by OEMs. WHR technologies include Thermo-Electric Generator (TEG), Organic Rankine Cycle (ORC) and Electric Turbo-Compound (ETC) that have been practically implemented on few heavy-duty applications but have not been proved yet as effective and affordable solutions for passenger cars. The paper deals with the analysis of opportunities and challenges of TEG and ETC technologies for a compact car, powered by a turbocharged SI engine. Specifically, the benefits achievable by TEG and ETC have been investigated by simulation analyses carried out by a dynamic engine-vehicle model, validated against steady-state and transient experimental data. The in-cylinder processes and friction losses of the engine are modeled by a black-box scalable parametric approach while grey-box dynamic models are applied for intake/exhaust manifolds and turbocharger. The TEG model is based on existing and commercial thermoelectric materials, specifically Bi₂Te₃. The simulations have been carried out considering standard driving cycles (i.e. NEDC, WLTC) and the results evidence that significant improvement of fuel economy and CO₂ reduction can be achieved by suitable management and configuration of the WHR systems, depending on engine speed and load and auxiliaries demand.

Keywords :- Engine modeling, Powertrain simulation, Waste heat recovery, Turbo-Compound, Thermo-Electric generator.

Paper Id: NCRST-23/62

Effects of Magnetic Field on Open-Circuit Potential of the Ni | HNO₃ + NaCl System

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ABSTRACT

The effects of the magnetic field on the open-circuit potential (OCP) of the Ni | HNO₃ + Cl-system were studied by using the electrochemical method, the surface analysis, and the non convective electrode. Although OCP was always shifted positively when the magnetic field was applied in the direction parallel (B//) or perpendicular (B-) to the electrode surface, the reasons were quite different. With the application of B//, the anodic shift of OCP was attributed to the positive shift of the cathodic overpotential (nc) because the Lorentz force (FL) was too low to affect the anodic reaction. However, with the application of B, it was attributed to the positive shift of the anodic over potential (na) because the field gradient force (F_{2B}) affects nc slightly.

Keywords : Nickel, open-circuit potential, corrosion, magnetic field.

Paper Id: NCRST-23/63

ELECTRICAL STRENGTH ANALYSIS OF SF6 GAS CIRCUIT BREAKER ELEMENT

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ABSTRACT

This paper addresses the problems, connected with calculation of the electric field and analysis of surface flashover of Node tank SF6 circuit breaker. The circuit-breaking part is easy as it is just the separation of contact but the arc that generates afterward which prevents the circuit from breaking and causes damage needs to be quenched as fast as possible. The arc strength depends on many variables such as [voltage](#), the gap between the contacts, temperature, pressure, etc. The arc can be quenched using various techniques and mediums. The SF6 circuit breaker is one of the many **types of circuit breakers** that uses the SF6 gas as the arc quenching medium to safely break the high voltage circuit. The gap between the grounded tank unit, a filter system and a conductive system is Receiving input power. The paper also provides the recommendations for change SF6 circuit breaker design.

Keywords:- SF6 circuit breaker; discharge; gas gap; surface flashover, electric strength.

Paper Id: NCRST-23/64

TECHNOLOGY OF HYBRID ELECTRIC VEHICLE

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ABSTRACT

The technology of hybrid electric vehicle is presented. This paper presents the development of hybrid electric vehicles, classifications of hybrid electric vehicles based on the arrangement of the internal combustion engine and the electric motor for traction. Comprise of an electric motor, inverter, battery as electric drive and an internal combustion engine with transmission connected as gasoline based drive. Hybrid electric vehicles comprise of an electric motor, inverter, battery as electric drive and an internal combustion engine with transmission connected as gasolinebased drive. It is to achieve better fuel economy and reduce toxic emissions. Hybrids consist of internal combustion engine so can be fuelled like normal cars but also has an electric motor and battery. It can achieve significantly better fuel efficiency than normal vehicle, they also pollute less and saves drivers money through fuel savings.

Keywords :- Series Hybrid Electric Vehicles, Parallel Hybrid Electric Vehicles, Fossil Fuel, Fuel Cell.

Paper Id: NCRST-23/65

PHOTOVOLTAIC CELL TECHNOLOGY & EFFICIENCY

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ABSTRACT

Photovoltaic (PV) cell technology is a method of converting sunlight directly into electricity using the photovoltaic effect. PV cells, also known as solar cells, are made of semiconducting materials, such as silicon. These cells are commonly used in solar panels to generate electricity for various applications, including residential, commercial, and utility-scale purposes. PV cell efficiency refers to the ability of a solar cell to convert sunlight into electricity. The higher the efficiency of a PV cell, the more sunlight it can convert into usable energy, resulting in greater electricity generation. Improving PV cell efficiency is an ongoing focus in the solar industry as it helps make solar energy more cost-effective and competitive with other energy sources. By continuously researching and developing new technologies and materials, scientists and engineers aim to enhance the efficiency of PV cells. This involves finding ways to optimize the absorption and utilization of sunlight by the cell, reducing energy losses during conversion, and improving overall performance. Increasing PV cell efficiency is crucial for making solar energy more accessible and economically viable. Higher efficiency means that less land and fewer solar panels are needed to generate the same amount of electricity, reducing installation costs and environmental impact. It also allows for greater energy production in areas with limited space or lower sunlight intensity.

KEYWORDS:- Photovoltaic (PV) cell technology Solar cells Semiconducting materials Silicon Solar panels Electricity generation

Paper Id: NCRST-23/66

INNOVATION CONCEPT OF BATTERY MANEGEMENT

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ABSTRACT

Optimizing the performance and extending the lifespan of energy storage systems. This abstract provides an overview of key battery management Techniques, including State of Charge (SoC), State of Health (SoH), and thermal management strategies. SoC monitoring ensures accurate energy measurement and utilization, while SoH assessment predicts battery life and reliability. Thermal management techniques, such as active cooling and heating, mitigate temperature-related Stressors to maintain battery health. By implementing these Strategies, battery systems can achieve higher efficiency, increased capacity retention, and prolonged operational life. This abstract underscores the importance of battery management in various applications, from electric vehicles to renewable energy storage.

Keywords: BMS.

Paper Id: NCRST-23/67

ENERGY CONSERVATION A MUST FOR BETTER FUTURE

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ABSTRACT

Energy Conservation refers to reducing energy consumption through using less of an energy service. Even though energy conservation reduces energy services, it can result in increased environmental quality, national financial security and higher savings. On a large Scale, energy conservation is an important element of energy policy. Energy conservation is often the most economical solution of energy shortages, Energy conservation is unquestionably of great importance to all of us, since we rely on energy for everything we do every single day. Energy supplied is limited and to maintain a good quality of life, we must use energy wisely. Energy conservation refers to the methods of reduction in energy consumption by way of elimination of wastage and promotion of efficiency. We know that due to the vast gap between demand supplies, lot of efforts is being done to bridge the gap in terms of generation of more electricity, which requires a lot of investment and create lots of environmental issues. Energy conservation is the key element of energy management. We can reduce the Energy consumption by adopting various ways of energy conservation which includes efficient use of technologies and avoiding energy wastages.

Keywords: *Energy Conservation.*

Paper Id: NCRST-23/68

BATTERY MANAGEMENT SYSTEM

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ABSTRACT

Due to their high efficiency and high energy density, lithium-ion batteries have been adopted for mobile electronic device and electric vehicles. They have been increasingly using further for various applications, such as small mobility vehicles (electric motorcycles, car etc.) Example – trucks, buses, car, two wheeler and industrial machinery. However, they have risks of fire hazard and electric shock if being used incorrectly. In order to use the highly efficient Lithium-ion batteries safely and effectively, a battery management system (BMS) is needed. Among the BMS, technologies of the battery capacity estimation and the function detection are important.

Keywords:- *State of charge (SOC), State of health (SOH), State of power (SOP), Battery prognostics, Battery diagnostics, Thermal management, Cell balancing, Battery safety, Battery recycling, Battery re-use.*

Paper Id: NCRST-23/69

THE IMPORTANCE OF RENEWABLE ENERGY SOURCE IN TURKEY

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ABSTRACT

Turkey is rapidly growing in terms of both its industrial production and population. Parallel to this, its demand for energy is amounting fast. Energy is one of Turkey's most important development preferences today. Turkey's energy necessity is fundamentally dependent on oil, natural gas, and electricity. On the other hand, Turkey's energy production meets only 30% of its total energy consumption and Thereby is an energy importing country. On other hand, Turkey has a large Potential for renewable energies. The renewable sources in Turkey are solar, wind, Biomass, hydro, solar and geothermal Most of Turkey's production facilities are based on fossil fuels. However, every year, Turkey has to meet a great burden to meet the costs of importing fossil fuels and the costs of the damages that occur in the environment by the utilization of fossil fuels and their by products which is environmental degradation. Besides Turkey is an abundant country with respect to renewable energy sources and could benefit considerably by the utilization of this green type energy. Moreover, the Implementation of renewable energy technologies can lower the current national and global environmental problems.

Paper Id: NCRST-23/70

SOLAR PANEL SYSTEM

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ABSTRACT

Solar PV systems can be installed on rooftop areas of residential, commercial and industrial buildings. In this chapter the design aspects of grid-tied solar PV system are presented. The applications, benefits and technical aspects of BIPV systems are discussed. The string inverter, micro inverter and DC optimizers of different manufacturers are described. The rooftop mounting methodology including the East-West mounting is explained. The costing of system has been done and life cycle cost and labialized cost of energy (LCOE) for a typical example of 52 kW solar PV systems, has been estimated. The reliability of the solar PV system and failure modes of solar modules in the field are discussed. The system issues like tripping of the inverter due to voltage rise issue, module failure due to potential induced degradation and fire and burning of modules and roof are discussed.

Keywords:-Photovoltaic (PV) materials, Building Integrated Photovoltaic (BIPV), Labialized cost of energy (LCOE)

Paper Id: NCRST-23/71

RADAR TECHNOLOGY

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ABSTRACT

Radar, short for Radio Detection and Ranging, is a technology that utilizes radio waves to detect, locate, and track objects. Its key components include a transmitter, antenna, receiver, and signal processor. Radar systems operate on the principle of emitting radio waves and measuring their reflections from objects, allowing for a variety of applications. *Military*: Radar is widely used in defence for detecting aircraft, ships, missiles, and threats. *Aviation*: Air traffic control relies on radar for tracking and guiding aircraft, and weather radar monitors weather conditions. *Weather Forecasting*: Radar systems track precipitation, storms, and atmospheric conditions, aiding in weather prediction. *Navigation*: Radar is crucial for marine and land based navigation, providing precise position determination. *Automotive*: Radar-based sensors are used in vehicles for collision avoidance and adaptive cruise control. *Remote Sensing*: Synthetic Aperture Radar (SAR) provides detailed imaging for Earth observation. Modern radar systems incorporate advanced signal processing, integration with other technologies like GPS, and automation for improved accuracy and safety. Radar technology plays a vital role in enhancing security, safety, and situational awareness across various industries and applications.

KEYWORD: -Military, Aviation, Weather forecasting, Navigation, Automotive, Remote sensing.

Paper Id: NCRST-23/72

BATTERY TECHNOLOGY

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ABSTRACT

Battery technology is the science of designing, manufacturing, and using energy storage devices. Batteries are used in a wide variety of applications, from powering portable electronic devices to storing energy from renewable sources. There are many different types of batteries, each with its own advantages and disadvantages. The most common type of battery used today is the lithium-ion battery. Lithium-ion batteries are energy-dense, meaning they can store a lot of energy in a small and lightweight package. They are also rechargeable, making them ideal for a wide range of applications. *Lithium-sulfur batteries*: Lithium-sulfur batteries have a much higher energy density than lithium-ion batteries. This means that they could potentially power electric vehicles for longer distances on a single charge. However, lithium-sulfur batteries are also less durable and have a shorter lifespan than lithium-ion batteries. *Sodium-ion batteries*: Sodium-ion batteries are similar to lithium-ion batteries, but they use sodium instead of lithium as the cathode material. Sodium is much cheaper and more abundant than lithium, which makes sodium-ion batteries a more affordable option.

KEYWORD: *Lithium-ion Battery, Lithium-sulphur batteries, Sodium-ion batteries.*

RECENT DEVELOPMENTS IN COMMUNICATION ENGINEERING

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ABSTRACT

FSO (Free Space Optical Communication) is a communication process that uses light carrying information to travel in air medium or in free space to share data between two or more points. The word "Free Space" refers to the outer space like Vacuum, Air or something very similar to this. FSO has been proved to be cost effective, highly secured and easily installable. It also has a larger bandwidth and high speed information exchange capacity. In FSO as the light signal is transmitted through the atmosphere, so it is essential to take the weather conditions into consideration. In this work the bit error rate (BER), Q-factor as well as its corresponding eye-diagram is analyzed for single transmitter/receiver FSO model under different atmospheric conditions like clear sky, rain, fog. OPTI-SYSTEM 14.0 of OPTIWAVE software is used in this work to determine various parameters.

KEYWORD: *FSO, BER analyzer, Q- factor, Eye-diagram, Atmospheric attenuation.*

Paper Id: NCRST-23/74

A Review on the Recent Advances in the Domain of Smart Grid Communications

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ABSTRACT

The growing complexity of power grids, rising energy demands, and the pressing need for increased reliability, security, and efficiency, while also addressing environmental sustainability concerns, underscore the urgency of a substantial leap forward in harnessing communication and information technologies. There is a broad consensus on the importance of promoting the adoption of smart grids, which seamlessly combine electrical grids and communication infrastructures to create an intelligent electricity network. This network collaboratively manages all interconnected components to provide sustainable and dependable electricity supplies. Several advanced communication technologies have been identified for smart grid applications, with the potential to significantly enhance the overall efficiency of power grids. A smart grid represents a modernized electricity network characterized by precise power-flow control, self-healing capabilities, and improved energy reliability and security through the application of digital communications and control technology. Transforming an existing power grid into a smart grid heavily relies on intelligent and secure communication infrastructures. This transformation necessitates the development of security frameworks for distributed communications, along with the integration of pervasive computing and sensing technologies within the smart grid ecosystem. However, it's worth noting that many of the communication technologies currently recommended for smart grids are vulnerable to cyber threats, which could lead to unreliable system operations, resulting in unnecessary costs and potential disasters for both utility providers and consumers. Looking forward, we can identify three primary challenges in implementing smart grid communication systems: ensuring standards compatibility, enabling cognitive access to unlicensed radio spectra, and addressing cyber security vulnerabilities. The objective of this paper is to provide an exhaustive review of the most recent research advances in the realm of smart grid communications.

KEYWORDS: *Smart Grid development, Communication systems, Cyber security, Energy reliability*

Paper Id: NCRST-23/75

**IMPROVED ACTIVE AND REACTIVE POWER SHARING ON AC MICROGRID USING
DROOP CONTROL**

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ABSTRACT

Droop control is a popular method for managing active power in power systems without the need for internal communication. Active and reactive electricity from distributed generation have been controlled locally in microgrids. It is frequently used in conventional power plants to regulate the amount of synchronous generator electricity sent to the grid. The benefits of droop control include reduced complexity and cost of system operation, as well as improved reliability. However, the conventional droop control strategy has several limitations that hinder its Delayed transient dynamics, voltage and frequency load dependence, poor power sharing accuracy, and poor power quality for non-linear or unbalanced loads are all uses in modern microgrids. Researchers have proposed different methods to overcome these challenges, making improved droop controllers an exciting area of research. This chapter provides an overview of some of the improved droop controllers that have been developed to address these issues and improve the performance of droop control in microgrid.

Keywords—droop control, PSS, Distributed control, Microgrid.

Paper Id: NCRST-23/76

**Load frequency control of a multi-area power system by optimum designing of frequency-based
PID controller using Genetic Algorithm**

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Abstract-In this study, a potent optimization method known as Genetic Algorithm (GA) is used to design an optimal load frequency control (LFC) of a multi-area power system. It has been demonstrated that GA is capable of addressing challenging real-world optimization issues, and as a result, academics are giving it a lot of thought. In order to stop power system oscillations, a load frequency controller based on GA is presented in this study. Considered is a two-region power system with PID controllers in each area that is based on thermal power plants (TPPs). GA is used to achieve the PID controller's optimal parameters, which are obtained by time domain minimization of the objective function. To demonstrate the superiority of the suggested method for controlling PID parameters, the performance of the proposed controller is compared to a Particle Swarm Optimization (PSO) based PID controller. Simulation results have demonstrated that the suggested algorithm and improved PID outperform earlier techniques.

Keywords- Load frequency control (LFC), multi-area power system, PID controller, particle swarm optimization (PSO), genetic algorithm (GA)

Medical Cyber Physical Systems

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Abstract

Medical Cyber Physical System (MCPS) is emerging as an advanced perspective for e-healthcare services to overcome the human error to fulfil the demand of continuous and high quality healthcare services. It includes monitoring of patient's medical wearable devices, medical process and automatic decision making process without the intervention of human (i.e. physician and caretaker). It provides the platform to communicate between patient, physician and the hospital management system and access the patient's treatment file and electronic records easily. MCPS encourages the medical devices industry for the advancement of integrated medical devices based on embedded software and efficient network connectivity to control the different physiological and physical characteristics of patient. Although heterogeneity of telemedicine system makes them cost effective and infrastructure less but the increased number of patients and diseases creates challenging issues such as patient's mobility in home-care, scalability, genericity, reliability, dynamicity, safety and security which can be addressed by Internet of Medical Things (IoMT). The connection of medical device to the traditional IoT demands further need of managing communication between large number of heterogeneous devices and interoperability. To satisfy these requirements, IoMT need a set of method designed to combine computing system and physical process to achieve the computer controlled physical systems.

As compared to traditional medical system the MCPS introduced extra complexity leads to arise few challenging issues. The issues include security and privacy, high assurance in system software, context aware intelligence, autonomy and interoperability. The security and safety aspect is considered as one of the most critical one due to the risk of being attacked to the patient's health along with the data, devices and internal MCPS network of the organisation. Mobile edge computing and fog computing plays an important role to solve this issues by deploying and managing efficient resources at the edge network to achieve low latency. At this point, the user interface design need to be improved for easy operation of devices and to avoid the human error. There is requirement of continuous monitoring care system to get real time information about patient's health during emergency in case of home and ambulance based care.

Research Direction in Medical Cyber Physical System

- Current Scenario of research issues and challenges emerge from MCPS.
- Architecture of Cyber Physical System (CPS) based smart healthcare system using IoMT.
- Focusing on the design models based on MEC or Fog computing to deal with the security and latency issues.

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Applications of Artificial Intelligence (AI) in healthcare: A review

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ABSTRACT

The goal of artificial intelligence (AI) is to imitate cognitive processes in humans. Due to the expanding availability of healthcare data and the quick advancement of analytics techniques, it is bringing about a paradigm shift in healthcare. We examine the state of AI applications in healthcare now and speculate about their future. Modern healthcare is being revolutionized and strengthened by artificial intelligence-based technology that can comprehend, learn, and act, whether they are used to find novel correlations between genetic codes or to guide surgical robots. It is capable of spotting subtle patterns that humans would utterly miss. The numerous contemporary uses of AI in the health industry are examined and discussed in this paper. The study specifically focuses on the three newest applications of AI in healthcare: AI-driven drug development, clinical trials, and patient care. The results show that AI-assisted clinical trials are able to handle enormous amounts of data and generate extremely precise outcomes. Companies that specialize in medical AI create solutions that support patients on all levels. Clinical intelligence also examines the medical information of the patients and offers insights to help them enhance their quality of life.

Keywords: Artificial intelligence, drug development driven by AI, clinical trial support helped by AI, patient care.

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A STUDY OF UPFC FOR POWER QUALITY IMPROVEMENT

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ABSTRACT

An UPFC is a FACTS device that regulates the system Voltage by absorbing or generating reactive power at a point of Coupling connection. It is a solid State DC/AC power switching converter that consists mainly Of a three-phase PWM voltage source converter (VSC) bridge having Thyristor based architecture. It is Connected to the distribution network via the impedance of the Coupling transformer. A DC-link capacitor provides constant DC link voltage. This research work has discussed Modeling and Simulation of Conventional UPFC .The Current research works has been carried out under MATLAB/SIMULINK environment and the system giving satisfactory results for various test conditions .The Unified Power Flow Conditioner (UPFC) combines a shunt energetic filter with the series active filter in a back-to-back configuration to simultaneously compensate the supply voltage and the harmonics present or to mitigate any kind of voltage and present fluctuations and various element correction in a energy distribution community. The present work can be extended by adopting GA and other optimized algorithm based UPFC configuration along with connecting renewable sources. Power generated by wind or solar energy can be fed to the DC link through converter to make the UPFC more effective during severe system conditions.

Keywords :UPFC,FACTS,PWM,VSC,Coupling Transformer.

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**PERFORMANCE ANALYSIS OF SEPARATELY EXCITED DC SHUNT MOTOR USING
PWM RECTIFIER**

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ABSTRACT

Dc motor speed can be controlled either decreasing the armature voltage or by decreasing the filed flux. As a result of its simple controllability, DC motors are frequently used for load characteristics and speed control. DC motors are therefore widely used for business purposes. Speed control of DC motor is very important in application where required speed is precision and correcting signal representing and to operate motor at constant speed ,so we used PWM is a technology that can control a DC motor's speed while meeting all requirements. PWM based speed control system consists of electronic component.

In order to control the speed of a separately excited DC shunt motor at different required torque levels, it is necessary to adjust the voltage applied to the motor. The motor speed is exclusively determined by the torque needs for any given constant voltage, and top speed is attained under minimal torque conditions.

In this project the separately excited DC shunt motor speed is controlled by varying the firing angle fed to 3 phase fully controlled rectifier and performance analysis output DC current, voltage and input AC voltage and also speed torque characteristics are observed for various motor drive.

Keywords :- DC shunt motor, armature voltage, rectifier, torque

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Design of Millimeter Wave Micro strip Patch Antenna and Its Array for 5G Application

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ABSTRACT

This paper presents a micro strip patch antenna for future 5G- Communication technology. A millimeter wave micro strip patch antenna and its array for 5 applications is proposed here .The 5G Micro strip patch is designed on rogers RT Duroid 5880 substrate with standard thickness 0.787 mm having relative dielectric constant(ϵ_r)=22 and $\tan \delta=0.0013$. The antenna resonates at 24.85GHz with a return loss -19.5 dB and a bandwidth 1.318 GHz. An array of 1*4 element of the proposed antenna is designed using tapered line feeding. The antenna array resonates at four different frequencies i.e 23 GHz, 27.09 GHz, 31 GHz and 42.5 GHz. Appreciable improvements in gain is observed with the array of antennas. The antenna and its array can be used for 5G mobile communication because of its compactness. A low cost substrate and small size patch best suited for miniaturized devices.

Keywords- Microstrip patch, Bandwidth, 5G, Antenna array, Tapered line feeding

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**INTER CARRIER INTERFERENCE CANCELLATION IN OFDM
SYSTEMS**

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ABSTRACT

Orthogonal Frequency Division Multiplexing (OFDM) is an emerging multi-carrier modulation scheme, which has been adopted for several wireless standards such as IEEE 802.11a and HiperLAN2. A well-known problem of OFDM is its sensitivity to frequency offset between the transmitted and received carrier frequencies. This frequency offset introduces inter-carrier interference (ICI) in the OFDM symbol. This project investigates two methods for combating the effects of ICI: ICI self-cancellation (SC), and extended Kalman filter (EKF) method. These two methods are compared in terms of bit error rate performance, bandwidth efficiency, and computational complexity. Through simulations, it is shown that the two techniques are effective in mitigating the effects of ICI. For high values of the frequency offset and for higher order modulation schemes, EKF method performs better than the SC method.



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