

# ELECTRIC CO

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**DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING**  
**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (A)**

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Accredited by NAAC with "A" Grade & NBA(CSE, IT, ECE, EEE, &ME) under Tier-I  
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## Foreword

### Principal

I am delighted to present this edition of our Electrical and Electronics Engineering (EEE) department magazine, a testament to the creativity and hard work of our students and faculty. This publication not only showcases remarkable projects and achievements but also reflects our commitment to innovation and excellence in the ever-evolving field of engineering. I encourage everyone to engage with the content and celebrate the spirit of collaboration that defines our EEE community. Together, we can continue to inspire and shape the future of technology.

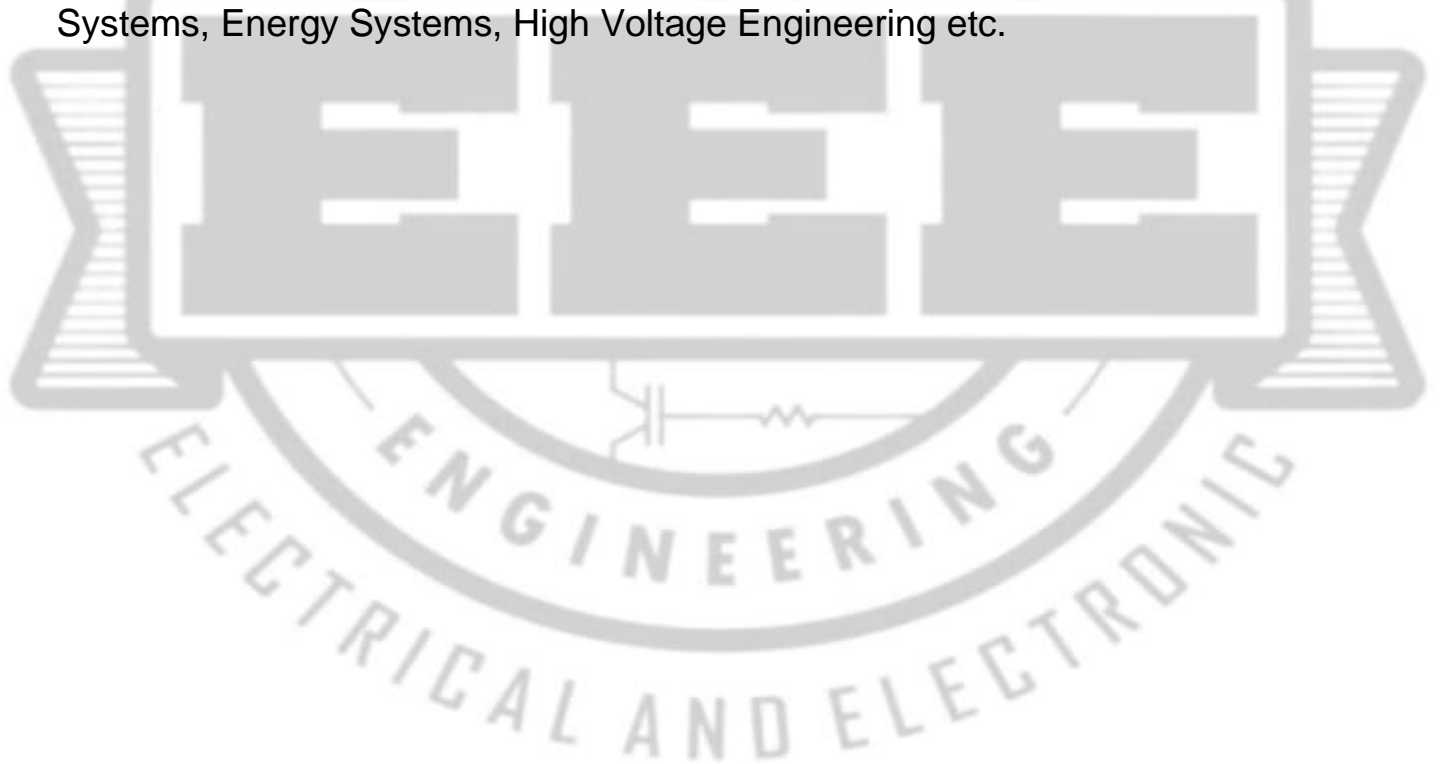


### HOD

It is with immense pride that I introduce this edition of our Electrical and Electronics Engineering (EEE) department magazine. This publication is a celebration of the talent, innovation, and dedication that our students and faculty bring to the field. Inside, you will find an array of projects, research highlights, and insightful articles that showcase the dynamic learning environment we foster. As we navigate the challenges and opportunities in technology, this magazine reflects our commitment to academic excellence and collaboration. I encourage all readers to immerse themselves in the inspiring stories within these pages and to continue pushing the boundaries of knowledge and creativity in our field.

## About the department:

The department of Electrical and Electronics Engineering is one of the oldest and major departments of the Institute. Since its inception in 1998, the department has been actively engaged in teaching and research in diverse fields of Electrical and Electronics Engineering. The department offers B.Tech in EEE and M.Tech in Power Electronics and Drives programmes. All its programmes are approved by AICTE, New Delhi. The department is strong with few faculty members holding Ph.D degrees and expertise in various fields. Initially B.Tech program was started with an intake of 40 in 1998 and subsequently increased to 120 in the year 2012. M.Tech (PE & D) program was started in the year 2011 with an intake of 18 students. The department of EEE has adequate and well-qualified faculties spanning all major areas of Electrical Engineering like Power Systems, Power Electronics, Control Systems, Energy Systems, High Voltage Engineering etc.



## **VISION:**

To contribute to the country and the world through technical education, research and consultancy in Electrical and Electronics Engineering.

## **MISSION:**

1. provide broad based education in Electrical and Electronics Engineering.
2. To keep the curriculum industry friendly.
3. To undertake sponsored research and provide consultancy services in industrial, educational and society relevant areas in Electrical and Electronics Engineering.
4. To promote ethical and moral values among the students so as to make them emerge as responsible professionals

## **Program Educational Objectives (PEOs):**

**PEO1:** Design and develop innovative products and services in the field of Electrical and Electronics Engineering and allied engineering, disciplines.

**PEO2:** Apply the knowledge of Electrical and Electronics Engineering to solve problems of social relevance, pursue higher education and research.

**PEO3:** Work effectively as individuals and as team members multidisciplinary projects. .

**PEO4:** Engage in lifelong learning, career enhancement and adapt to changing professional and societal needs.



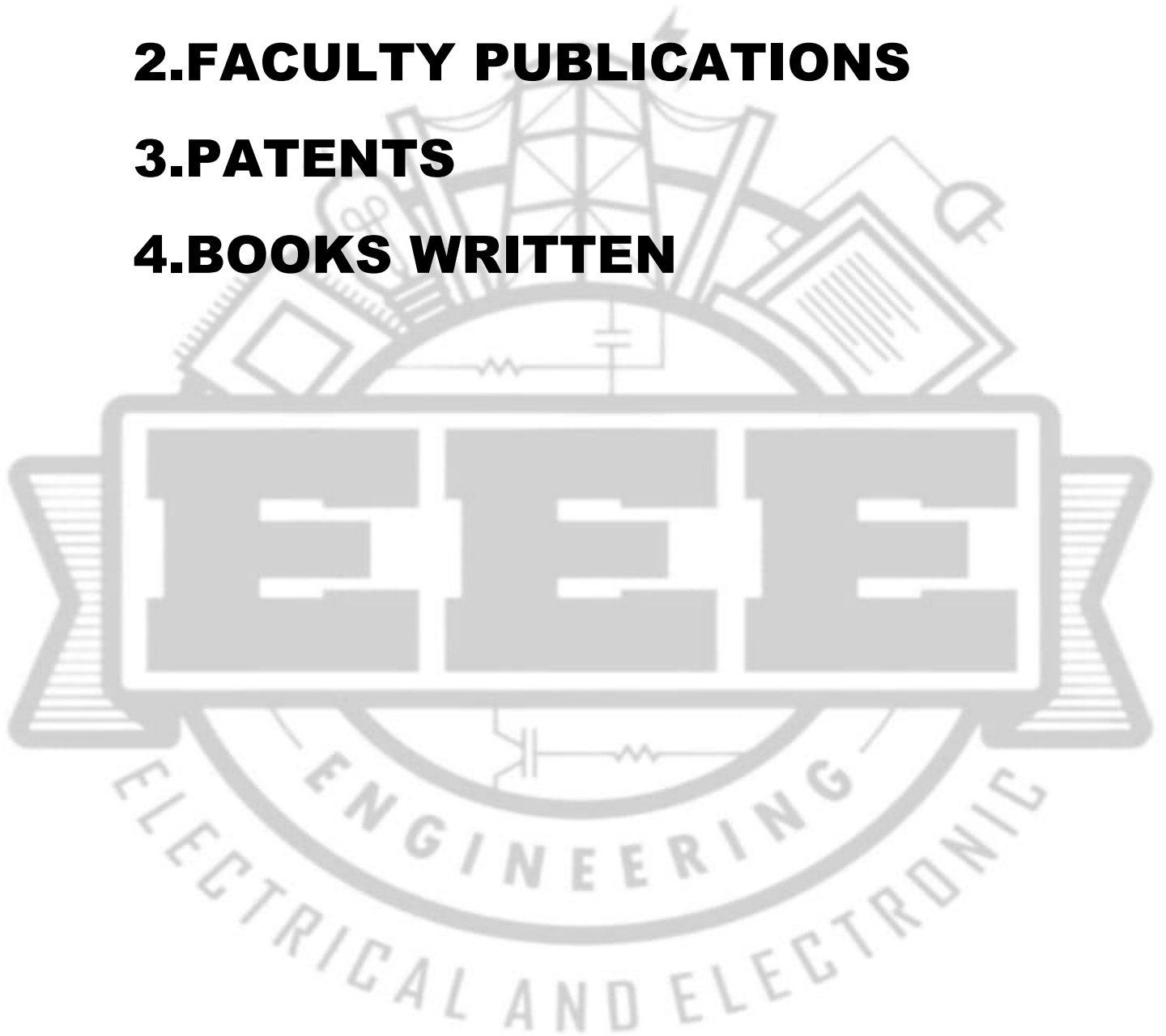
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## ARTICLES

### **Humanitarian developments of advanced electrical and energy technology**

Although this article has focused mostly on high technology situations, there are many situations throughout the world where better use of existing and inexpensive technologies and sensors would substantially transform many lives. The author, working as a consultant to a major development bank looking at building a new power station, once visited a major power station in the Ukraine where 10 large boilers were poorly controlled, and the operators were mainly interested in obtaining a cheap hand-held optical pyrometer to allow them to control boiler operations better. Open burning of waste is another area where better energy technology and better sensors to control combustion would be enormously helpful.

Improved biomass cooking in the third world would make significant improvements in the health of adults using cookstoves for example and there is a need to combine solar and bioenergy to reduce primary energy demands and to use biomass (which is frequently available) more effectively. In remote locations and refugee camps, basic lighting has been highlighted as a major need, however expensive or intricate systems are cost prohibitive in such locations, and the lack of maintenance infrastructure such as reliable wireless communications can contribute to accelerated depreciation and difficulty in maintaining installed systems. There is also a major need to develop alternative wireless sensors and monitoring devices. Nixon and Gaura, note that these are needed to gather data on a range of energy systems to inform decision making and management of shared community resources. The development or improved energy, lighting, and cooking fuel technologies would also substantially improve the overall the security of women and children in such settings.

## GRAPHENE SUPERCAPACITORS

Supercapacitors store energy and have higher capacitance values and lower voltage limits than traditional capacitors and can function somewhat like rechargeable batteries. Graphene supercapacitors are supercapacitors that use graphene in place of activated carbon in their electrodes.

A supercapacitor, which can often store almost as much energy as a lithium-ion battery, offers the advantages of increased energy storage. Supercapacitors allow for the power density of capacitors — they can deliver a lot of energy in quick bursts — while also providing high energy storage capabilities and charging incredibly rapidly.

Graphene helps enhance supercapacitors because it is exceptionally conductive, so graphene supercapacitors are ideal for high-frequency applications, whereas traditional supercapacitors are not. Graphene allows for structuring and scaling down, so it has applications in computer processing units (CPUs) and integrated circuits where standard capacitor materials do not.

Graphene supercapacitors may also be able to combine with carbon nanotubes to help connect the geometrically unique graphene structures into a comprehensive network. This combination might reduce costs and boost capacitance and performance.



## Augmented reality

Augmented reality (AR) is significantly progressing, particularly for industrial applications. A recent study shows that 65% of VR/AR companies focus on industrial use, whereas only 37% on consumer products. This shift towards industrial applications is attributed to the potent benefits AR and VR offer in such environments.

Virtual Reality (VR) aids industrial facilities by simulating hazardous scenarios, enabling companies to train employees without exposing them to actual dangers. Augmented Reality (AR), on the other hand, overlays real-time data on physical visuals, providing engineers and technicians with essential information about the industrial systems they are working with. This invaluable real-time data enhances their decision-making process during repairs and maintenance.

These technological advancements help industries to optimize productivity and ensure safety, thus revealing VR and AR's vast potential in revolutionizing industrial operations. As these technologies continue to evolve, it can be expected that their industrial applications will expand even further, paving the way for more efficient and safer work environments.

- ADEPU JUBILEE PRANEETH

## **Power Electronics for Enhanced Smart Grid Integration**

Smart grids, which use digital communication and advanced power electronics to enhance the reliability and efficiency of electrical distribution, have become a focal point for innovation in 2021-2022. Advances in power electronics, particularly with wide-bandgap materials like Silicon Carbide (SiC) and Gallium Nitride (GaN), have made it possible to improve the efficiency, speed, and resilience of grid systems.

These materials can handle higher voltages and temperatures than traditional silicon-based components, which is essential for integrating renewable energy sources, such as solar and wind, into the grid. The smart grid's ability to manage energy distribution dynamically in response to real-time data has led to improved energy efficiency, reduced transmission losses, and more reliable service.

Furthermore, the combination of power electronics with energy storage solutions, like batteries, enables better load balancing and grid stabilization. As more regions transition to cleaner, decentralized energy systems, advanced power electronics will play a pivotal role in enabling smart grids to deliver sustainable, reliable, and resilient electricity.

-NALLURI SIRISHA

## Wireless Charging

Wireless charging is revolutionizing the way we power our devices. It eliminates the need for cables and connectors, making the charging process more convenient and hassle-free. Utilizing electromagnetic fields to transfer energy between two points, typically a charger and a device, wireless charging operates on principles of electromagnetic induction or resonant inductive coupling.

Commonly supported by smartphones, smartwatches, and other gadgets, wireless charging pads or stands are increasingly becoming a standard accessory. The technology is constantly evolving, with newer innovations promising faster charging speeds and greater efficiency. One notable advancement is in the area of long-range wireless charging, which could eventually allow devices to be charged from several feet away.

Wireless charging offers numerous benefits, including reduced wear and tear on charging ports and cables, and the ability to charge multiple devices simultaneously. It also supports water and dust-resistant designs, as there is no need for exposed connectors. While challenges like slower charging speeds compared to wired options still exist, ongoing research and development are continually improving the performance and adoption of wireless charging technology.

## **Internet of Things(IOT)**

The advent of 5G technology has revolutionized the Internet of Things (IoT), offering speeds five times faster than its predecessor, 4G. IoT connects a myriad of “things” through the internet, including wearable technology, smartphones, sensors, and even animals. With the extensive rollout of 5G in 2021, IoT devices in various fields, particularly in electrical engineering, have surged. In construction, innovations like smart grids, Visible Light Communication, and Smart Lighting have become more common. Electrical contractors now see a growing demand for installing and maintaining IoT systems in buildings, leading to lucrative contracts for those skilled in IoT.

Project Management Software has also gained popularity among electrical engineering contractors. This software simplifies record-keeping, scheduling, billing, and tracking customer interactions, saving valuable time often spent on paperwork. Cloud-based programs ensure data safety and accessibility, allowing contractors to spend more time on-site.

Smart Grids, expected to become standard from 2021 onwards, enable communication between power networks and technology, allowing operators to gather diverse information. They facilitate households and companies generating their own power to manage and sell surplus, improving safety and efficiency. Electrical contractors must adapt to these smart grid technologies to stay relevant and competitive in the industry.

-GADE SASI KIRAN REDDY

## **FACULTY PUBLICATIONS**

### **K. Harinadha Reddy**

Variable converter Pulse Island test in integrated distributed generation of electrical energy system:

In integrated distributed generation systems, the Variable Converter Pulse (VCP) Island test is a crucial method for ensuring safe and reliable operation. The VCP method is designed to detect islanding conditions, which occur when a portion of the power grid becomes electrically isolated. This is vital for protecting human safety and maintaining the integrity of converter devices working within interconnected electrical energy systems.

The VCP Island test identifies islanding by monitoring the rate of change in under/over voltage and under/over frequency. When these parameters deviate from their normal ranges, the system can quickly detect and respond to potential islanding situations<sup>1</sup>. This early detection helps prevent accidents and ensures a stable power supply.

By integrating VCP methods, engineers can improve the monitoring and control capabilities of distributed generation systems. This approach enhances the overall performance and reliability of the grid, allowing for better management of power distribution and minimizing the risk of unplanned outages. As the demand for distributed generation grows, the VCP Island test will play an increasingly important role in maintaining the safety and efficiency of modern electrical energy systems.

International Transactions on Electrical Energy Systems Vol.31, No.7, ISSN: 2050-7038 <https://doi.org/10.1002/2050-7038.12920> July, 2021 SCIE



## **Timmidi Nagadurga**

Enhancing Global Maximum Power Point of Solar Photovoltaic Strings under Partial Shading Conditions Using Chimp Optimization Algorithm:

Partial shading conditions in solar photovoltaic (PV) systems pose significant challenges such as multiple peaks in the power-voltage (P-V) characteristic curve, which complicate the identification of the Global Maximum Power Point (GMPP). Addressing this issue, researchers have proposed using the Chimp Optimization Algorithm (ChOA), a metaheuristic algorithm inspired by the social behavior and hunting strategies of chimps.

The ChOA excels in avoiding local maxima and consistently identifying the true GMPP across varying shading patterns. By modeling the chimps' cooperative and explorative behaviors, this algorithm effectively balances exploration and exploitation, leading to superior performance compared to traditional methods. Under partial shading, the ChOA demonstrates not only improved tracking accuracy but also faster convergence rates, ensuring optimal energy extraction from PV strings.

Applied to electrical engineering, the ChOA enhances the efficiency and reliability of solar power systems, which is crucial for sustainable energy solutions. As partial shading frequently affects real-world PV installations, the adoption of advanced algorithms like ChOA signifies a leap towards maximizing solar energy output, thus supporting the global transition to renewable energy sources. This innovative approach holds great promise for overcoming the inherent challenges and inefficiencies associated with conventional GMPP tracking techniques.

## **Rowthu Padma**

Design an Automatic Power Supply and Implementing Using Three Different Sources with Microcontroller :

The system aims to provide an uninterrupted power supply by seamlessly switching between solar, wind, and battery power sources based on availability and demand. This is crucial for distributed generation systems, especially in regions with unreliable grid power. The proposed design integrates advanced algorithms for efficient energy management and maximizes the utilization of renewable energy sources.

By using a microcontroller, the system ensures real-time monitoring and control of power flows, enhancing the stability and reliability of the power supply. This innovation not only contributes to sustainable energy solutions but also provides a blueprint for future research on improving power systems' efficiency and resilience. The authors' work represents a significant advancement in the field of electrical engineering and renewable energy technologies, offering practical solutions to common challenges in power management.

Journal of Huazhong University of Science and Technology Vol.50, No.7, Page: 1-7, ISSN: 1671- 4512. [https://m.box.com/shared\\_item/https%3A%2F%2Fapp.box.com%2Fs%2F6zfl5l5zfucl78od4uwztdp5vulj5dcj](https://m.box.com/shared_item/https%3A%2F%2Fapp.box.com%2Fs%2F6zfl5l5zfucl78od4uwztdp5vulj5dcj) July, 2021 Scopus

## **B. Pangedaiah**

### **Voltage Tripping Circuit For GSM Modem Distributed System load Alert System With Microcontroller:**

The Voltage Tripping Circuit for a GSM Modem Distributed System Load Alert System using a Microcontroller plays a crucial role in ensuring power stability and safety. This system is designed to monitor voltage levels in real-time and provide immediate alerts in cases of over-voltage or under-voltage situations.

The system incorporates a microcontroller to constantly check the voltage levels, ensuring they remain within safe operating ranges. When an anomaly is detected, the microcontroller activates a tripping mechanism to isolate the affected section, preventing potential damage to the connected loads. Additionally, a GSM module sends alerts via SMS to designated users, enabling prompt intervention.

This innovative approach ensures the protection of electrical equipment in distributed systems, which is particularly important in areas with unstable power supply. By integrating this voltage tripping circuit with a GSM alert system, the reliability and efficiency of power management systems are significantly enhanced. The implementation of such technology is a step towards smarter and safer electrical infrastructures, providing a reliable solution for managing and mitigating power anomalies in distributed generation systems.

## PATENTS

**Name of Inventor :** Dr.A V G A Marthanda

**Title of Patent :** IOT based Smart Control and Monitor Various Aspects of Syatems

**Published Year & Month:** August 2021

**PATENT APPLICATION ID:** 202141033541 A

**Status :** Published

In smart homes, IoT systems control lighting, heating, security, and appliances to optimize energy consumption and enhance comfort. Agriculture benefits from IoT through precision farming, where soil moisture, temperature, and humidity sensors help optimize irrigation and crop health. Healthcare applications include remote patient monitoring, where wearable devices track vital signs and notify caregivers of any anomalies. Industrial automation utilizes IoT for predictive maintenance, monitoring equipment performance, and reducing downtime.

IoT-based smart control and monitoring systems transform conventional practices, increasing efficiency, reducing operational costs, and promoting sustainable solutions. As technology evolves, IoT's potential to further improve system control and monitoring across diverse fields will continue to expand.



**Name of Inventor :** Dr.G.Nageswara Rao

**Title of Patent :** A High- Frequency Oscillator Inverter with an Adjustable Reactance

**Published Year & Month:** August 2021

**PATENT APPLICATION ID:** 202141035788

**Status :** Published

A high-frequency oscillator inverter with adjustable reactance is an essential component in advanced power electronics. This inverter operates at very high frequencies, often exceeding 30 MHz, and is designed to convert DC power into AC power for various applications.

The key feature of this inverter is its adjustable reactance, which allows for precise control over the output frequency and impedance. This adaptability ensures optimal performance across different load conditions and helps in minimizing power losses. The inverter's high-frequency operation enables the use of smaller passive components, resulting in a more compact and efficient design.

These inverters are commonly used in applications such as wireless power transfer, RF amplifiers, and high-frequency power supplies. Implementing advanced semiconductor technologies like GaN (Gallium Nitride) further enhances the efficiency and performance of these inverters. The integration of adjustable reactance not only improves operational flexibility but also contributes to the stability and reliability of power conversion systems.



**Name of Inventor :** Dr. P.Sobha Rani & Dr.M.S.Giridhar

**Title of Patent :** Method and System for providing Plug-In Based Intelligent Hybrid Electric Vehicles

**Published Year & Month:** October 2021

**PATENT APPLICATION ID:** 202141038602 A

**Status :** Published concerns Plug-in based intelligent hybrid electric vehicles (HEVs) represent a significant advancement in automotive technology. These vehicles combine the benefits of traditional internal combustion engines with electric propulsion systems, offering improved fuel efficiency and reduced environmental impact.

The system integrates smart control technologies, enabling seamless transitions between power sources and optimizing energy usage. Advanced algorithms, such as those based on fuzzy logic and artificial neural networks, manage power flow to enhance performance and extend battery life. Additionally, plug-in capabilities allow for convenient recharging from external power grids, reducing dependence on fossil fuels.

These intelligent HEVs also incorporate connectivity features, utilizing sensors, GPS, and communication modules to provide real-time data on vehicle status and driving conditions. This data helps in making informed decisions, ensuring optimal energy management, and improving overall driving experience.

The integration of these advanced technologies in HEVs paves the way for more sustainable and efficient transportation solutions, addressing both environmental and economic.

## **BOOKS WRITTEN**

**Name of the Author:** Dr.A V G A Marthanda

**Title of the Book / Chapter:** Power Quality Management

**Name of the Publisher with Address:** Scientific International Publishing House (SIPH). 32B, Mazhuppan Street, Mannargudi, Tamilnadu, India.

**ISBN number: ISBN:** 978-93-5625-015-4

<https://www.flipkart.com/power-quality-management/p/itm3262ca3b6fa32?pid=9789356250154>

**Name of the Author:** K. Ramalingeswara Prasad

**Title of the Book / Chapter:** Study of Controllers for an Isolated Full Bridge Boost Converter Topology in Fuel Cell Applications: A Comparative Approach

**Name of the Publisher with Address:** Newest Updates in Physical Science Research Vol. 13, B.P Publishers, West Bengal, India

**Print ISBN:** 978-93-91595-25-8

**eBook ISBN:** 978-93-91595-33-3

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