National seminar on opportunities and challenges of electric vehicle and smart grid

(08.05.2023 to 12.05.2023)

Date & session: 08.05.2023.FN **Speaker: Dr. Mahalakshmi Ganapathee**

Title: EV technology and its real-time issues

Keynote:

Battery Life: EVs' operational longevity depends on battery life, which can degrade over time and reduce vehicle range and performance. Charging Infrastructure: An insufficient charging station, particularly in non-urban areas, poses a significant barrier to broader EV adoption. Charging Time: EVs require longer charging times than refueling traditional vehicles, posing potential inconvenience. Battery Disposal: Discarding depleted EV batteries poses an environmental challenge due to limited recycling capabilities. Range Anxiety: The fear of running out of charge before reaching a charging station inhibits some potential EV buyers.

Date & session: 08.05.2023.AN **speaker: Mr. Selvakumar**

Title: Role of Smart Grid in PV & EV Integration

Keynote:

Load Balancing: Smart Grids facilitate dynamic load balancing. They manage the power demand fluctuations caused by the variable output from PV systems and the irregular charging pattern of EVs, thus ensuring stability. Demand Response: With two-way communication capabilities, Smart Grids can execute demand response strategies. For instance, during peak solar production, EV charging can be incentivized to utilize the excess power effectively. Energy Storage: Smart Grids can coordinate with EVs to act as mobile energy storage units. During periods of low demand or high PV production, EVs can be charged. This stored energy can then be fed back into the grid during peak demand, enhancing grid resilience. Grid Monitoring and Control: Smart Grids offer real-time monitoring and control capabilities. These functions help manage the complexities arising from integrating PV systems and EVs, reducing potential grid failures.

Date & session: 09.05.2023.FN **speaker: Dr.N.kumarappan Narayanan**

Title: Role of Smart Grid in PV & EV Integration

Keynote:

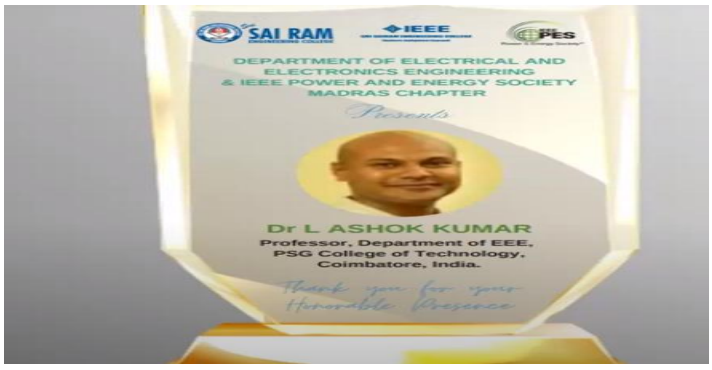
Interlinking Converter Control: The interlinking converter, which connects the AC and DC subgrids, plays a critical role in maintaining stability. Controlling this converter to ensure power balance while dealing with fluctuating power sources and loads is complex. Protection System: The combination of AC and DC systems increases the complexity of the protection system, making fault detection, isolation, and subsequent system restoration more challenging. Power Quality: Power quality issues, such as harmonics, power factor issues, and voltage sags or swells, can be more difficult to manage in hybrid microgrids. Stability: Maintaining stability in hybrid AC/DC microgrids can be challenging due to the varying dynamics of AC and DC systems.

Date & session: 09.05.2023.AN **speaker: Dr. Dr.L.Ashok kumar**

Title: Role of Smart Grid in PV & EV Integration

Keynote

Electric Motor: This is the primary propulsion component, replacing the internal combustion engine in traditional vehicles. EVs can have one or multiple motors. Battery Pack: The battery stores electrical energy used to power the vehicle. Its size and capacity greatly influence the vehicle's range. Power Electronics: This includes the inverter, which converts DC power from the battery to AC power for the motor, and the onboard charger, which converts AC power from the charging station to DC power to charge the battery. Charging Port: This is where the vehicle connects to a charging station. Energy Management System: This system manages the distribution of electrical power throughout the vehicle and optimizes energy usage.

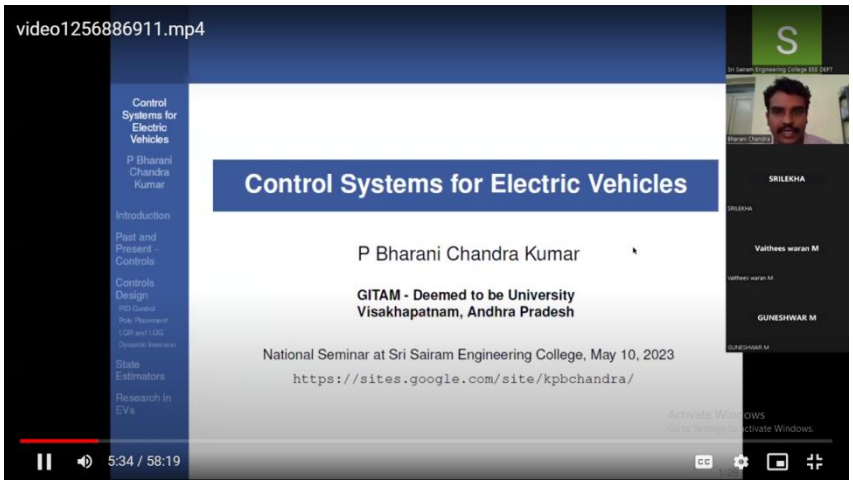


Date & session: 10.05.2023.FN **speaker: Dr.PBharani Chandra Kumar**

Title: Control Systems for EVs

Keynote

The electric vehicle (EV) ecosystem, from its vehicle architecture to control systems, is a complex and sophisticated network of technologies working together to ensure efficient, clean, and reliable transportation. EV technology, underpinned by elements like the electric motor, battery pack, power electronics, and various control systems, represents a significant shift from traditional internal combustion engine vehicles. While there are still challenges to be addressed, such as battery life, charging infrastructure, and grid capacity, advancements are being made at a rapid pace. The role of intelligent infrastructures like the Smart Grid and Hybrid AC/DC microgrids in the integration of renewable energy sources and EVs is also crucial. By overcoming these challenges and continuing to innovate, we can pave the way for a sustainable and efficient transportation future dominated by electric vehicles.

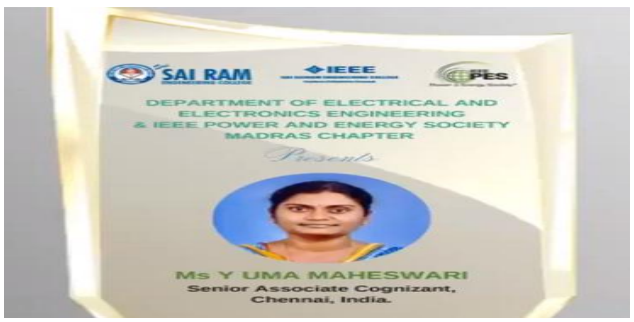


Date & session: 10.05.2023.AN **speaker: Ms. Uma Maheswari**

Title: Electromagnetic issues and mitigation techniques in EV

Keynote

Electromagnetic issues are a significant area of concern in electric vehicles (EVs) due to the high-power electronic devices, converters, and cables used in these vehicles. These elements can generate electromagnetic interference (EMI), which can disrupt the normal operation of electronic systems within the vehicle and potentially cause safety issues. Furthermore, the generated electromagnetic fields (EMF) could potentially affect human health, which makes controlling EMF exposure essential. Mitigation techniques, including proper shielding, filtering, and the use of high-quality components, are crucial in managing and reducing EMI. Cable arrangement and grounding can also help minimize EMI. Additionally, innovative motor designs, like the use of segmented motor cores or the application of soft magnetic composite materials, can help reduce electromagnetic noise.

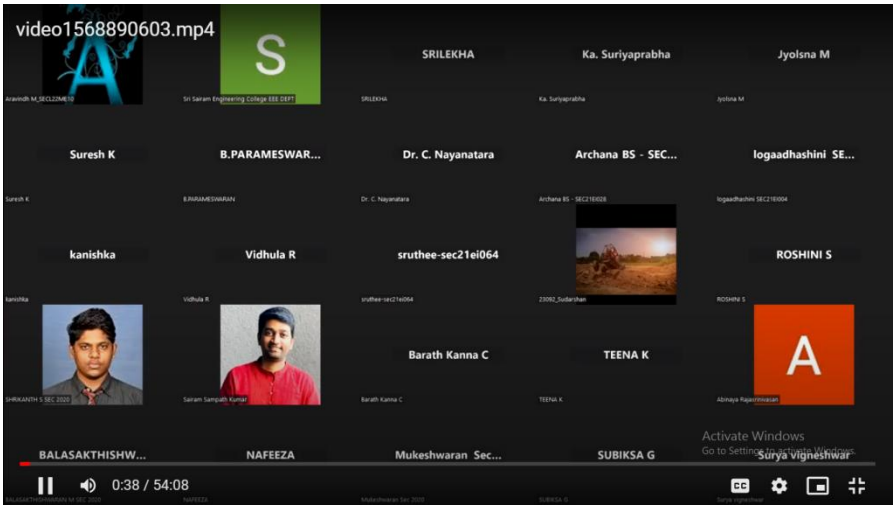


Date & session: 11.05.2023.FN **speaker: Mr. Sairam**

Title: EV Battery Charging

Keynote

The process of EV battery charging is a fundamental aspect of the electric vehicle experience and represents a key area of focus in the ongoing advancement of EV technology. Its importance spans not just the functional necessity of recharging an EV's battery, but it also significantly impacts the practicality, convenience, and overall acceptance of EVs by consumers. There are challenges that come with EV battery charging, such as the need for more charging infrastructure, particularly in rural and remote areas, the long charging times compared to traditional fueling, and the issue of range anxiety. It also involves managing load on the power grid and considering the source of the electricity, which could affect the environmental benefits of EVs.



Date & session: 11.05.2023.AN **speaker: Mr. SAIKAT DAS**

Title: EV Battery Charging

Keynote

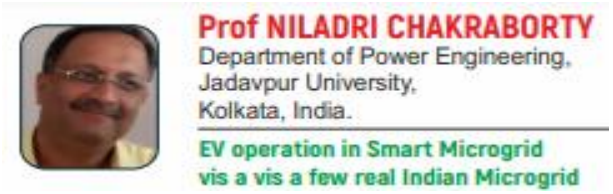
The design and characteristics of EV motors, whether they are induction motors, permanent magnet motors, or newer technologies like switched reluctance motors, directly impact the vehicle's torque, speed, range, and overall performance. Additionally, powertrain configurations, such as single-motor or multi-motor setups, influence vehicle dynamics like acceleration and handling. Despite these challenges, continuous technological advancements are driving improvements in motor and powertrain designs. Efforts are being made to develop high-efficiency, low-cost, and sustainable motor technologies.

Date & session: 12.05.2023.FN **speaker: Prof NILADRI CHAKRABORTY**

Title: EV operation in Smart Microgrid via few real Indian Microgrid

Keynote:

The integration of Electric Vehicles (EVs) into smart microgrids represents a significant step towards optimizing energy usage, promoting renewable resources, and paving the way for a resilient, green, and distributed power system. The dynamic interaction between EVs and smart microgrids could potentially help balance loads, provide ancillary services, and enable peak shaving, thereby improving the overall stability and efficiency of the grid. In the Indian context, although the concept of smart microgrids and EV integration is still relatively nascent, there are notable strides being made. Several pilot projects and studies are underway to understand the feasibility and impact of such a system. India's unique challenges, such as a vast rural population and regions with unreliable grid connectivity, present a compelling case for the adoption of smart microgrids.



Date & session: 12.05.2023.AN **speaker: Dr.J.Kamala**

Title: Battery management system

Keynote:

The Battery Management System (BMS) is a critical component in Electric Vehicles (EVs), serving as the brain of the battery pack. It monitors and manages the performance, safety, and efficiency of the battery, affecting the overall reliability and longevity of the vehicle. Challenges exist, such as creating a BMS that can accommodate the ever-evolving battery chemistries and accurately predict parameters like state of charge (SoC) and state of health (SoH). Ensuring safe operation under various conditions is another key concern. However, advancements in BMS technologies, such as AI and machine learning-based prediction models, wireless BMS, and improved thermal management, are enhancing the capabilities of BMS, promising more reliable and efficient EV operation