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Notice for the PhD Viva Voce Examination

Mr Thandava Krishna Sai Pandraju, Registration Number: 1970094, PhD Scholar at the School of Engineering and Technology, CHRIST (Deemed to be University) will defend his PhD thesis at the public viva-voce examination on Friday, 19 June 2026 at 10.30 am in CDI Conference Room, III Floor, Block V, Bangalore Kengeri Campus, CHRIST (Deemed to be University), Bengaluru - 560074, Karnataka, India.

Title of the Thesis	:	**Optimal Reconfiguration of Radial Distribution System Under Varying Renewable Energy and Electric Vehicle Fleet Load**
Discipline	:	**Electrical and Electronics Engineering**
External Examiner - I	:	**Dr Arigela Sri Satya Veerendra Babu** Associate Professor Department of Electrical and Electronics Engineering Manipal Institute of Technology Manipal Academy of Higher Education Manipal - 576104 Karnataka
External Examiner - II	:	**Dr S Srinivasa Rao** Professor Department of Electrical Engineering National Institute of Technology Warangal (NIT-W) Hanamkonda, Warangal - 506 004 Telangana
Supervisor	:	**Dr Varaprasad Janamala** Associate Professor Department of Electrical and Electronics Engineering School of Engineering and Technology CHRIST (Deemed to be University) Bangalore Kengeri Campus Bengaluru - 560074 Karnataka

The members of the Research Advisory Committee of the Scholar, the faculty members of the Department and the School, interested experts and research scholars of all the branches of research are cordially invited to attend this open viva–voce examination.

Registrar (Academics)

Place: Bengaluru
Date: 03 June 2026

ABSTRACT

The rapid evolution of electrical distribution networks (EDNs) is propelled by the escalating demand for electricity, environmental considerations, and the extensive integration of renewable energy sources and electric vehicles. This thesis introduces a comprehensive optimization framework to improve the performance of RDNs by integrating renewable distributed generation (RDGs), optimal network reconfiguration (ONR), and coordinated allocation of EV charging infrastructure. Initially, static and voltage-dependent load models are developed to assess voltage stability and system loadability under various operating conditions. Mathematical models for PV-based DG and EV fleet loads are incorporated into the load-flow formulation. A multi-objective optimization problem is formulated to minimize real power losses, voltage deviation, and greenhouse gas (GHG) emissions while maximizing voltage stability, system loadability, and network reliability, subject to power balance, voltage limits, thermal limits, and radiality constraints.

To address this complex and nonlinear multi-objective problem, advanced meta-heuristic optimization techniques, including the Butterfly Optimization Algorithm (BOA), Pathfinder Algorithm (PFA), and their improved variants, are proposed. These techniques are employed to determine optimal network configuration, PV placement and sizing, and EV charging station allocation under both static and dynamic operating scenarios, accounting for load, PV generation, and EV fleet load variability. The proposed framework offers a reliable and practical solution for modern smart distribution networks with high penetration of renewable energy and electric vehicles.

Keywords: *Radial Distribution System, Network Reconfiguration, Solar Photovoltaic System, Electric Vehicles, Charging Stations, Power Loss Minimization, Reliability Enhancement.*

Publications:

1. **Thandava Krishna Sai Pandraju** and Varaprasad Janamala. "Dynamic optimal network reconfiguration under photovoltaic generation and electric vehicle fleet load variability using self-adaptive butterfly optimization algorithm." International Journal of Emerging Electric Power Systems 22.4 (2021): 423-437.
2. **Thandava Krishna Sai Pandraju** and Varaprasad Janamala. "An enhanced pathfinder algorithm for optimal integration of solar photovoltaics and rapid charging stations in low-voltage radial feeders." Journal of Solar Energy Research 8.4 (2023): 1680-1690.
3. Varaprasad Janamala and **Thandava Krishna Sai Pandraju**. "Static Voltage Stability of Reconfigurable Radial Distribution System Considering Voltage\Dependent Load Models." Mathematical Modelling of Engineering Problems 7.3 (2020).
4. **Thandava Krishna Sai Pandraju** and Varaprasad Janamala. "Butterfly optimization algorithm-based optimal sizing and integration of photovoltaic system in multi-lateral distribution network for interoperability." Communication and Intelligent Systems: Proceedings of ICCIS 2020. Springer Singapore, 2021. 201-209.
5. **Thandava Krishna Sai Pandraju** and Varaprasad Janamala. "Self-adaptive butterfly optimization for simultaneous optimal integration of electric vehicle fleets and renewable distribution generation." Congress on Intelligent Systems. Springer Nature Singapore, 2022.