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A Special Session on

Advanced Control and Power Electronics Solutions for Hybrid and Meshed Microgrid

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&

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Aims & Scope:

Due to various important features such as higher efficiency, reliability, stability and voltage regulation, DC microgrids are attractive options for supplying various DC loads. Moreover, several energy sources can also be directly connected to DC microgrid. However, most of the present loads are AC loads supplied by the existing AC lines. For achieving benefits of both ac and dc microgrids, these two types of microgrids can be interconnected to realize hybrid and meshed microgrids. These have great potentials to improve the performance of electric grid, loads and various energy sources. Due to the presence of dc system, the hybrid and meshed microgrids have higher power handling capacity and better voltage regulation capability as compared to the conventional ac microgrid. The integration of the electric vehicle (EV) charging stations, renewable energy sources (RES) and battery energy storage systems (BESSs) to the microgrid faces multiple challenges in power management and optimized energy transport. Advanced architectural structures for the hybrid and meshed microgrids would further improve the efficiency and reliability of the system. However, the involvement of more number of power electronic converters increases the complexity of network control

operations. The hybrid and meshed microgrid enables various power flow paths in the electric grid requiring development of optimal power flow algorithms for continuous and stable operation of overall system. This special issue focuses on the development of architectural configurations and advanced control methods for the power electronic converters for hybrid and meshed microgrids.

Subtopics:

This special session invites original manuscripts presenting recent advances in these fields with special reference to the following topics**:**

- Advanced power converter design in meshed and hybrid microgrid
- Advanced control with multifunctional features in meshed and hybrid microgrid
- Optimal power flow in meshed and hybrid microgrid
- Protection and stability issues in meshed and hybrid microgrid
- Control of power converters during adverse grid conditions in meshed and hybrid microgrid
- Inertia support by power converters in meshed and hybrid microgrid
- PV, wind, BESS, EV Integration issues in meshed and hybrid microgrid
- Power quality issues in meshed and hybrid microgrid
- Islanding and anti-islanding challenges in meshed and hybrid microgrid
- Power converter reliability in meshed and hybrid microgrid

Special Session Organizer 1

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- **Dr. Dipti** received the B.Tech degree in Electrical Engineering from Biju Pattnaik University of Technology, Rourkela in 2006 and M.Tech from SRM University, Chennai, India in 2011. He has received the Ph.D. degree in Electrical Engineering from National Institute of Technology, Rourkela, India in 2017. His research interest includes Power electronics converters, Induction motor drive control, Fuzzy logic controller, Nonlinear controllers

power quality. He has published his research articles in many IEEE Transactions, SCI and Web of Science International Journals. He is also one recognized reviewer for many reputed International Journals like IEEE Transactions on Power Electronics, IEEE Circuits and Systems, International Journal of Electrical Power and Energy Systems, **Elsevier** International Journal of Electric Power Components and Systems, **Taylor and Francis** International Transaction of Electrical Systems, Wiley, International Journal of Electronics, **Taylor and Francis**, International Journal of Emerging Electric Power Systems, **DE GRUYTER.** He is currently working as Senior Assistant Professor in O.P. Jindal University, Raigarh, Chhatishgarh India.

Special Session Organizer 2

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Dr. Madhu received the Bachelor's from NIT Jamshedpur and Masters degrees in electrical engineering from NIT Patna, India with University gold medals and a Ph.D. degree in electrical engineering from National Institute Technology, Rourkela, India. She is working for National Institute Technology (NIT) where she is currently the Associate Professor in Electrical Engineering Dept..

Her research interests include renewable energy integration and applications in smart grid, power electronics for aerospace, electric vehicle applications, low carbon electrical energy systems, and power electronic solutions to sustainability. She serves as a Reviewer for the IEEE, IET, and many other international journals and conferences.