

Stability Modelling and Analysis of Converter Driven Power System

IEEE PES Distinguished Lecturer Program (DLP)

Organized by IEEE Power and Energy Society Singapore Chapter

Hybrid Event (in-person & virtual)



Prof Bikash Pal

Professor of Power Systems
Imperial College London (ICL)

Date: 1 Dec 2023 (Friday)

Time: 2.30pm – 5.30pm

Venue: LT24, South Spine,
Nanyang Technological University,
639798, Singapore

Light refreshment will be provided

Registration: <https://bit.ly/47Qw4wu> **Zoom link for virtual attendance:** <https://bit.ly/3Gi2x32>



Meeting ID: 853 0880 8267

Passcode: 8MUpnZ



Abstract: The number of power electronics converters connected to electrical networks has been growing exponentially as they are part of all new generation connected to the grid. While the rapid control and fast electronic switching available with this technology offer flexibility in network operation, the dynamic interactions between several of them threaten the operational stability of the transmission grid is a concern. It is required to develop a methodology for identifying the risks associated with the stability and control interaction before a new power electronic device (e.g. Windfarm, interconnector, STATCOM) is introduced to the network

The talk will focus on an analytical framework in impedance domain to quantify the interaction between the new plant and the rest of the network for setting additional grid connection study specifications which will include detail technical study to check and mitigate the risks associated with new power electronics interfaced generation. The framework developed is to support MMC technology, control delay, system strength and FRT capability of dynamic voltage support devices and windfarm through technical case study conducted at the research group of Bikash Pal at Imperial College London. Future research challenges and opportunities will be highlighted.

Speaker: Bikash Pal is a Professor of Power Systems at Imperial College London (ICL). He is research active in power system stability, control, and estimation. Currently he is leading a six university UK-China research consortium on Resilient Operation of Sustainable Energy Systems (ROSES) as part of EPSRC-NSFC Programme on Sustainable Energy Supply.

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He led UK-China research consortium project on Power network stability with grid scale storage (2014-2017): His research is conducted in strategic partnership with ABB, SIEMENS, GE Grid Solutions, UK, and National Grid, UK, UK Power Networks. SIEMENS R&D collaborated with him to develop fast power flow and volt-var control tools in Spectrum Power, an advanced module for distribution management system solution from SIEMENS. This is now commissioned in distribution control centres in Columbia, Bosnia Norway and Azerbaijan serving 15 million customers in these countries. GE commissioned sequel of projects with him to analyse and solve wind farm HVDC grid interaction problems (2013-2019). Prof Pal was the chief technical consultant for a panel of experts appointed by the UNFCCC CDM (United Nations Framework Convention on Climate Change Clean Development Mechanism). He has offered trainings in Chile, Qatar, UAE, Malaysia and India in power system protections, stability and control topics. He has developed and validated a prize winning 68-bus power system model, which now forms a part of IEEE Benchmark Systems as a standard for researchers to validate their innovations in stability analysis and control design. He was the Editor-in-Chief of IEEE Transactions on Sustainable Energy (2012-2017) and Editor-in-Chief of IET Generation, Transmission and Distribution (2005-2012). He is Vice President, PES Publications (2019-2023). In 2016, his research team won the President's outstanding research team award at Imperial College London (ICL). He is Fellow of IEEE for his contribution to power system stability and control. He is Fellow of The Royal Academy of engineering, UK for the impact of his contribution to the field. He is an IEEE Distinguished Lecturer in Power distribution system estimation and control. He has published about 125 papers in IEEE Transactions and authored four books in power system modelling, dynamics, estimations and control. He was Otto Monsted Professor at Denmark Technical University (DTU) (2019) and Mercator Professor sponsored by German Research Foundation (DFG) at University of Duisburg-Essen in 2011.