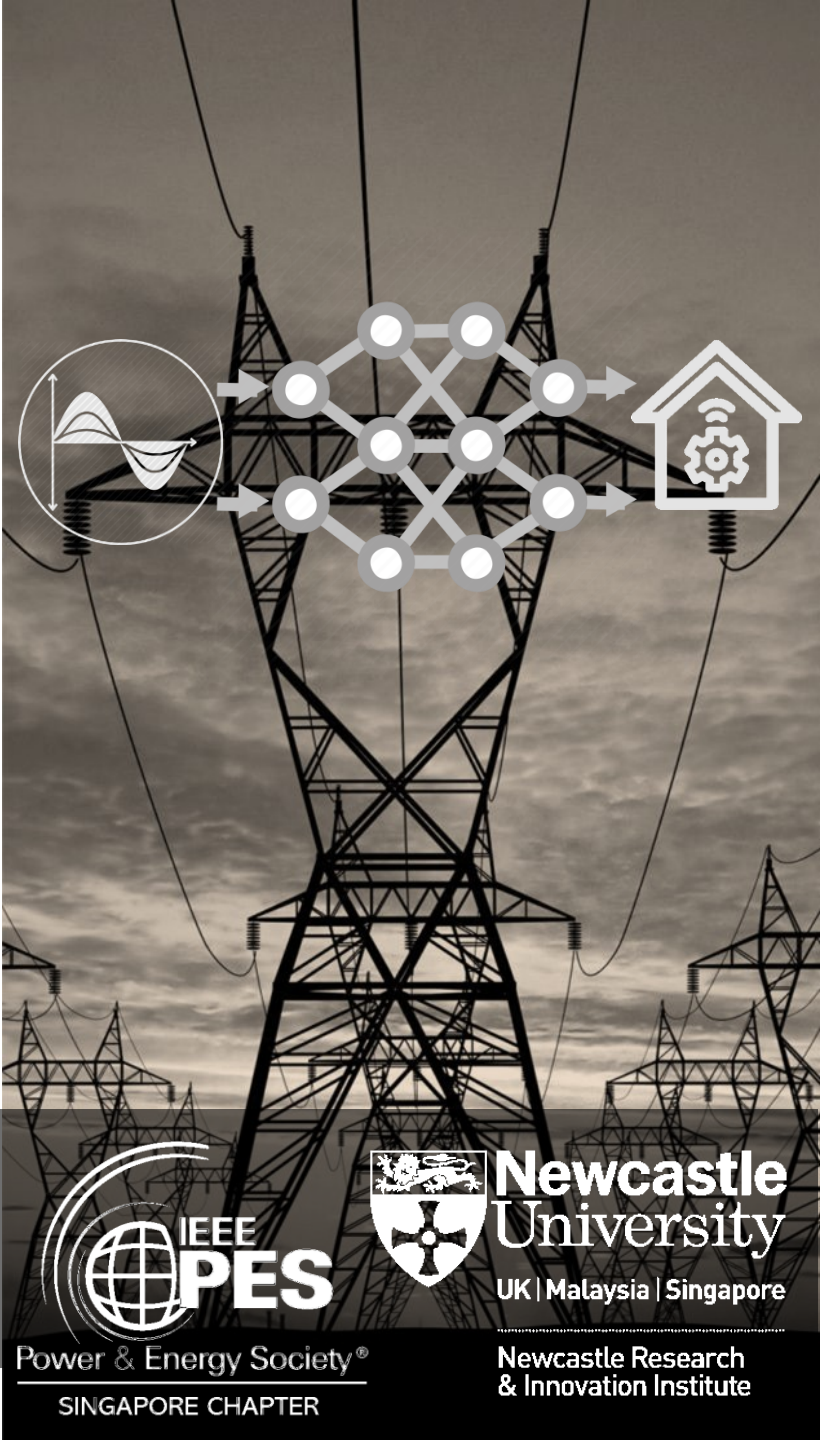

LIVE WEBINAR

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Robust Constraint Model Predictive Voltage Control in Active Distribution Network

Presented by Salish Maharjan
PhD Graduate from National University of Singapore and Collaborated with A* Star Research Institute

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Title: "Robust constraint model predictive voltage control in active distribution network"

Abstract: High penetration of renewables in the distribution network brings significant uncertainties, especially during volatile weather conditions. Hence, the network controllers should be designed to account for these uncertainties, and respond to unpredictable events like voltage-dips for reliable voltage control. This paper proposes a control scheme, where inverter-based Distributed Energy Resources (DERs) respond locally with Q(V) control and adapt to set-points assigned by the centralized controller (CC). The Robust Constrained Model Predictive Control (RCMPC) scheme is proposed for centralized voltage control. It robustly deploys control resources from DERs and tap-changers to regulate the lower/upper bound of node voltages within the targeted limit. Moreover, RCMPC ensures minimum resource utilization by relaxing the targeted voltage limit whenever it anticipates significant uncertainties. The CC is implemented in Python, which communicates with the RMS model of the UKGDS network for measurements and dispatching set-points. The performance of RCMPC is compared with deterministic MPC (DMCP) at 5, 10, and 15-minute time-steps of CC. The proposed RCMPC is able to regulate the node voltage even at a higher degree of uncertainty seen at a 15-minute time-step. In contrast, the DMPC could not contain the node voltages under the targeted limit and worsened at a larger time-step.

Speaker: Dr Salish Maharjan

Short Bio: Salish is a PhD graduate from Department of Electrical and Computer Engineering at National University of Singapore. He worked as a student researcher in A* Star Research Institute, Experimental Power Grid Center, Singapore, during his PhD study. His research interest includes convex optimization, robust control, distributed control, and stability analysis of power distribution systems.

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