

Department of Electrical and Computer Engineering

Title: « ***Defining, Evaluating and Boosting Power Systems Resilience to High-impact Low-probability Events*** »

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Room ΠΤΕΡ – E116, Old Campus – University of Cyprus

Abstract:

The design and operation of the critical power infrastructure has been traditionally driven by the key reliability principles of security and adequacy, which allow dealing with known and credible threats so as to guarantee high quality power supply to end users on a nearly continuous basis. However, as evidenced by several catastrophes that occurred worldwide in the last decade or so, it is becoming increasingly apparent that further considerations beyond the classical reliability-oriented view are needed for keeping the lights on. Hence, a power infrastructure that can maintain high levels of performance under any condition should be *reliable* to the most “common” blackouts, but also *resilient* to the high-impact low-probability (HILP) events, such as extreme weather.

This seminar will first discuss a conceptual framework of *resilience* within the context of power systems, which will help differentiate the concept of resilience from the one of reliability and provide the key characteristics that a resilient power system should possess, along with the main resilience enhancement measures. Next, a probabilistic multi-temporal and multi-spatial resilience assessment procedure (based on AC Optimal Power Flow (OPF) and Sequential Monte Carlo simulations) will be presented for assessing the resilience of power systems to HILP events, with focus on the impact modelling of weather fronts moving across the transmission networks. Following this, different risk-based adaptation strategies will be presented for boosting power systems resilience, which are driven by the resilience achievement worth (RAW) indices of the individual transmission components. A reduced version of the Great Britain transmission network will be used for implementing and demonstrating this methodology.

Biography:

Mathaios Panteli is a Post-Doctoral Research Associate (PDRA) in the Department of Electrical and Computer Engineering at the University of Cyprus. He received his BEng Degree from Aristotle University of Thessaloniki, Greece, in July 2009 and his PhD from The University of Manchester, UK, in March 2013. He worked within the Electrical Energy and Power Systems group of The University of Manchester as a PDRA for three years. His main research interests include the analysis and prevention of blackouts, reliability and resilience assessment of power systems, wide-area protection schemes and situation awareness. He is the author of several international peer-reviewed journal and conference papers in these research areas.