Announcing the Final Examination of Mohamed Al Hosani for the degree of Doctor of Philosophy

Time & Location: October 23, 2013 at 1:00 PM in HEC 450
Title: Transient and Distributed Algorithms to Improve Islanding Detection Capability of Inverter Based Distributed Generation

Recently, a lot of research work has been dedicated toward enhancing performance, reliability and integrity of distributed energy resources that are integrated into distribution networks. The problem of islanding detection and islanding prevention (i.e. anti-islanding) has stimulated a lot of research due to its role in severely compromising the safety of working personnel and resulting in equipment damages. Various Islanding Detection Methods (IDMs) have been developed within the last ten years in anticipation of the tremendous increase in the penetration of Distributed Generation (DG) in distribution system. This work proposes new IDMs that rely on transient and distributed behaviors to improve integrity and performance of DGs while maintaining multi-DG islanding detection capability.

In this thesis, the following questions have been addressed: How to utilize the transient behavior arising from an islanding condition to improve detectability and robust performance of IDMs in a distributive manner? How to reduce the negative stability impact of the well-known Sandia Frequency Shift (SFS) IDM while maintaining its islanding detection capability? How to incorporate the perturbations provided by each of DGs in such a way that the negative interference of different IDMs is minimized without the need of any type of communication among the different DGs?

It is shown that the proposed techniques are local, scalable and robust against different loading conditions and topology changes. Also, the proposed techniques can successfully distinguish an islanding condition from other disturbances that may occur in power system networks. This work improves the efficiency, reliability and safety of integrated DGs, which presents a necessary advance toward making electric power grids a smart grid.

Major: Electrical Engineering

Educational Career:
Bachelor's of B.S. in Electrical Engineering, BS, 2008, American University of Sharjah
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Approved for distribution by Zhihua Qu, Committee Chair, on September 22, 2013.

The public is welcome to attend.