Islanding phenomenon Detection of Distributed Generations

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ABSTRACT

Distributed generation (DG) is a modern technology that has the ability to improve the power system efficiency, reliability, and increases the system flexibility. However, if there is not a suitable control system, DGs cause some power quality problems such as voltage fluctuations, frequency deviations and the harmonics distortion. However the most important issue related to DGs is the islanding phenomenon**.**

This study develops new islanding detection methods. The first method is based on the voltage and current measurements and processing of these signals with a Fourier transform to find the second harmonic. Then, the symmetrical components of the second harmonic of voltage and current signals measured at the wind farm side are used to feed an artificial neural network (ANN). The proposed artificial neural network is used through different environments of power quality to identify whether the abnormity at the point of common coupling (PCC) is a power quality disturbance or an actual islanding operation**.**

The second method is based on the rms values of the negative and zero sequence voltages at DG side to detect islanding phenomenon. The rms values of the negative and zero sequence

voltages are calculated over a running average window of one cycle of the specified fundamental frequency then compared to threshold values to judge if the abnormity at the point of common coupling (PCC) is a power quality disturbance or a real islanding operation**.**

The third method is based on the voltage measurements and processing of this signal to calculate the total harmonic distortion and find the second harmonic and the dc component with a Fourier transform. Then, they are used as inputs for an artificial neural network. The results show that the proposed islanding detection methods succeed in detecting islanding.