An Islanding Detection Method for Multiple DGs Based on the DWT and Phase Angle Between Negative Sequence Voltage and Current

Generally, with large changes in loading of Distributed Generations (DGs) after loss of the main power supply, islanding conditions can be detected easily by monitoring several parameters in conventional methods: voltage magnitude, phase displacement and frequency change. However, in case of small changes in loading the conventional methods have some difficulty in detecting such a particular islanding conditions. In this paper, a high speed and accuracy method is proposed for Multiple Distributed Generations (MDGs) islanding detection in distribution networks. The method is based on two criteria including: 3rd decomposition level of unbalance voltage magnitude by using Discrete Wavelet Transform (DWT) with Daubechies mother wavelet and also phase angle difference between negative sequence voltage and current. The performance of the method i.e. accuracy, speed and reliability is evaluated by using a sample IEEE 31 node standard distribution network and considering three scenarios including ground fault, load rejection and capacitor bank switching. The PSCAD/EMTDC is sued to simulate these scenarios. Simulation results showed that the proposed method can detect correctly the islanding operation and also Non Detection Zone (NDZ) reduced, remarkably in comparison with conventional methods. So, it is expected that the proposed method can be effectively implemented in distribution networks for Islanding Detection (ID) of MDGs.

Keywords: Islanding detection, Discrete Wavelet Transform, Negative sequence, Distributed Generation
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