Abstract

Under-voltage load shedding (UVLS) is an important technique to maintain the voltage stability and frequency of a power system network. UVLS has been applied widely in transmission systems to avoid system blackouts. However, with increasing penetration of distributed generation such as photovoltaic (PV) systems, the application of UVLS becomes important for islanded distribution systems. Under this condition, the network does not have a frequency reference as when it is connected to the grid. In this condition, when the load demand exceeds the PV capacity, UVLS is the only option to stabilize the system by shedding the load based on the changes of the voltage magnitude. In this work, a new UVLS scheme based on voltage stability indices is proposed. Four voltage stability indices are used as indicators for load shedding. Based on the stability indices, the loads that have the highest tendency of voltage collapse shall be the first ones to be shed. The proposed scheme is tested on a practical distribution network energized by a grid, a mini hydro generator, and a PV system. The test results on various scenarios prove that the