A novel islanding detection technique using modified Slantlet transform in multi-distributed generation

ABSTRACT

In this paper, a new hybrid islanding detection scheme based on a combination of a modified Slantlet Transform (MSLT) and machine learning is applied to a passive time frequency islanding detection of multiple distributed generation units. A Harmony Search Algorithm (HSA) is used to optimally specify suitable scales of Slantlet transform and Slantlet decomposition levels for accurate islanding classification. Slantlet transform is utilized to derive the features in the required detection parameters measured from islanding and non-islanding events using identified Slantlet scales. In order to automate classification process, machine learning classifiers are utilized to detect islanding and non-islanding conditions with an objective of increasing the detection rate and avoiding nuisance distributed generation tripping during non-islanding situations. Islanding and non-islanding events are simulated for a multi-distributed generations system and used to assess the performance of the proposed anti-islanding protection method. The numerical results showing the efficiency of the proposed islanding detection technique are explained and conclusions are drawn.