

A Neural Network Control for Voltage Balancing in Three-Phase Electric Power System

Authors : Dana M. Ragab, Jasim A. Ghaeb

Abstract : The three-phase power system suffers from different challenging problems, e.g. voltage unbalance conditions at the load side. The voltage unbalance usually degrades the power quality of the electric power system. Several techniques can be considered for load balancing including load reconfiguration, static synchronous compensator and static reactive power compensator. In this work an efficient neural network is designed to control the unbalanced condition in the Aqaba-Qatrania-South Amman (AQSA) electric power system. It is designed for highly enhanced response time of the reactive compensator for voltage balancing. The neural network is developed to determine the appropriate set of firing angles required for the thyristor-controlled reactor to balance the three load voltages accurately and quickly. The parameters of AQSA power system are considered in the laboratory model, and several test cases have been conducted to test and validate the proposed technique capabilities. The results have shown a high performance of the proposed Neural Network Control (NNC) technique for correcting the voltage unbalance conditions at three-phase load based on accuracy and response time.

Keywords : three-phase power system, reactive power control, voltage unbalance factor, neural network, power quality

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