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Improvement of Power Quality Using DVR Fuzzy Control and Comparing with PI method

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ABSTRACT

Due to increase in application of nonlinear load, sensitive equipment, electronic power control in industrial area and power quality of internal region achieves significance of increasing utilities and users. But nonlinear loads and non-zero impedance of the system might generate a lot of disturbance in the system. Most common disturbances include voltage sag, voltage swell, voltage difference, harmonic and etc. When the aforementioned disturbances stop generation process, lots of economic losses occur. Such problems can be solved using an equipment with series connection called dynamic voltage restorer (DVR).

Modeling and simulation of the proposed DVR is performed using MATLAB/SIMULINK. In this paper, fuzzy logic is used to improve DVR behavior in compensating voltage flash in the network. Simulations show that performance of DVR in balancing voltage sag/swell is efficient and satisfactory. DVR controls both balanced and unbalanced situations with sufficient efficiency/precision and injects proper voltage component so that any deviation in source voltage for preserving load voltage is modified. Results of this paper are compared with other articles which have used PI controller and comparison results show that the present method outperforms others. Main advantages of the proposed DVR include simple, efficient and fast matching control. Keywords: voltage sag, voltage swell, dynamic voltage restorer, pulse width modulation, fuzzy control

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