DYNAMIC VOLTAGE RESTORER (DVR) UNBLOCKING ZERO SEQUENCE FOR POWER QUALITY RECOVERY USING FUZZY POLAR LOGIC

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ABSTRACT

Voltage sags are the most frequent disturbance happened at this time. Consequences which can be caused by this disturbance are the black-out, failure and even damage to sensitive equipment. Until now still looking for the best way to overcome the problems voltage sags. On the other hand, protected sensitive equipment in general is a non-linear load that produces harmonics.

This study presents the use of DVR-based Fuzzy Polar as well as the restoring voltage sags able to compensate due to harmonic voltage distortion caused by nonlinear load. On a system with neutral grounding point, the disturbance voltage sags heavily influenced zero sequence components. Blocking transformer is generally installed in series with the DVR to reduce the effect of zero sequence components. Weaknesses DVR with blocking transformer is not applicable to the 4-wire distribution system. In this study proposed DVR with unblocking zero sequence method can be applied to a 4-wire distribution system. To compensate the zero sequence abc-axis modified to dq0-axis by calculating the value 0-axis so the use of blocking-transformers can be eliminated. Fuzzy polar controller is applied as a substitute for fuzzy logic controllers that have a lot of membership function. Fuzzy polar controller needs only 2 membership function.

Tests on voltage dips done on all kinds of fault with voltage dips by 30%, 50% and 70%. Tests performed on the voltage harmonic at THD of 13.08%, 10.78% and 8.31%. The use of dq0-axis and Fuzzy Polar methods as the controller is able to restore all types of voltage dips 30% to an average of 100%. Restore of all types of voltage dips 50% to an average of 99.75% and for all types of dips 70% to an average of 99.75%. This method is able to compensate for the distortion due to harmonic voltage distortion THD 13.08% to 3.16%. For THD 10.78% could be compensated to 2.42% and for THD 8.31% compensated to 1.76%.

Keywords : DVR, Unblocking Zero Sequence, Fuzzy Polar.