



Three-phase Series Active Power Filter to Protect Sensible Loads based on Fuzzy Voltage Controller at Distorted Supply Network

Chennai Salim⁽¹⁾, Benchouia Mohamed Toufik⁽²⁾, Goléa Amar⁽²⁾

⁽¹⁾ Electrical Engineering Department, Nuclear Research Center of Birine, Algeria

⁽²⁾ L.G.E.B, Electrical Engineering Department, Biskra University, Algeria

chenaisalimov@yahoo.fr, benchouiat@yahoo.fr

Abstract – This paper presents a three-phase three-wire series active power filter to compensate voltage harmonics perturbation for specific and sensible loads at distorted supply network. The conventional configuration is based on two-level voltage source inverter with hysteresis controller requiring a complex and a complicated mathematical model. To overcome this drawback and improve the series APF capability, a new control scheme using fuzzy control techniques is adopted in this work. Today fuzzy logic controllers are successfully employed in various industrial applications; their advantages are robustness and easy implementation. The proposed fuzzy voltage controller is designed to improve compensation capability of series active power filter by adjusting the voltage error using a fuzzy rule. The control strategy use instantaneous reactive power theory easy to implement and gives an excellent performances. The simulation is performed using MATLAB-Simulink and SimPowerSystem BlockSet Toolbox. The simulation results from complete structure including control and power circuits are presented and discussed.

Keywords: Series active power filter, Fuzzy logic voltage controller, Distorted supply network, Voltage harmonics, Sensible loads.
