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A versatile control scheme for a dynamic voltage restorer for power-quality improvement

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Abstract— This paper presents a control system based on a repetitive controller to compensate for key power-quality disturbances, namely voltage sags, harmonic voltages, and voltage imbalances, using a dynamic voltage restorer (DVR). The control scheme deals with all three disturbances simultaneously within a bandwidth. The control structure is quite simple and yet very robust; it contains a feedforward term to improve the transient response and a feedback term to enable zero error in steady state. The well-developed graphical facilities available in PSCAD/EMTDC are used to carry out all modeling aspects of the repetitive controller and test system. Simulation results show that the control approach performs very effectively and yields excellent voltage regulation.

Index Terms— Dynamic voltage restorer (DVR), harmonic distortion, power quality (PQ), repetitive control, voltage sag

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