

IMPROVEMENT OF THE VOLTAGE STABILITY IN THE DISTRIBUTION SYSTEM BY USING THE MULTIFUNCTIONAL DYNAMIC VOLTAGE RESTORER

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ABSTRACT

Dynamic voltage restorers (DVRs) are used to protect sensitive loads from the effects of voltage sags on the distribution feeder. This paper presents and verifies a novel voltage sag detection technique for use in conjunction with the main control system of a DVR. Also, the multiloop controller using the Posicast and P+Resonant controllers is proposed in order to improve the transient response and eliminate the steady-state error in DVR response, respectively. The proposed algorithm is applied to some disturbances in load voltage caused by induction motors starting, and a three-phase short circuit fault. Also, the capability of the proposed DVR has been tested to limit the downstream fault current. The current limitation will restore the point of common coupling (PCC) (the bus to which all feeders under study are connected) voltage and protect the DVR itself. The innovation here is that the DVR acts as virtual impedance with the main aim of protecting the PCC voltage during downstream fault without any problem in real power injection into the DVR. Simulation results show the capability of the DVR to control the emergency conditions of the distribution system

KEYWORDS: Dynamic Voltage Restorer (DVR), Emergency Control, Voltage Sag, Voltage Swell