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MITIGATION OF POWER QUALITY PROBLEMS USING SOLAR ENERGY-BASED THREE-PHASE DVR WITH FUZZY LOGIC CONTROLLED NOVEL BOOST INVERTER

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ABSTRACT

Voltage sags result in unwanted operation stops and large economic losses in industrial applications. A dynamic voltage restorer (DVR) is a power-electronics-based device conceived to protect high-power installations against these events. However, the design of a DVR control system is not straightforward and it has some peculiarities. First of all, a DVR includes a resonant (LC) connection filter with a lightly damped resonance. Secondly, the control system of a DVR should work properly regardless of the type of load, which can be linear or non-linear, to be protected. In order to improve the utilization rate and power quality of distributed new energy power generation technology and, to solve the voltage fluctuation problem in the operation of the Distributed photovoltaic storage and grid-connected system. This project proposes a control strategy based on DVR (dynamic voltage restorer) for operation of distributed photovoltaic storage and grid-connected. The remaining photovoltaic output energy is stored in energy storage via active bridge to reduce the waste of photovoltaic power.

To compensate the output voltage fluctuation of photovoltaic grid-connected inverter, the DVR was connected to the energy storage. And PI controller parameters of the DVR are optimized by ANFIS algorithm, realize the recovery of output voltage fluctuation of the photovoltaic grid-connected inverter. The advantages of the proposed control strategy are demonstrated using simulations, and the results show that the proposed strategy can ensure the quality of PV output voltage in the photovoltaic storage and grid connected. PV based DVR system is comprised of PV System with low and high power DC-DC boost converter, PWM voltage source inverter, series injection transformer and semiconductor switches. Simulation results proved the capability of the proposed DVR in mitigating the voltage sag, swell and outage in a low voltage distribution system.

KEYWORDS: *New Energy Power Generation Technology*

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