Solar Energy South Africa

Soft overvoltage in photovoltaic inverter

Overview

Can a coordinated Volt/VAR control structure optimize reactive power output of photovoltaic inverters?

This paper proposes a novel coordinated volt/VAR control structure which simultaneously optimizes the base reactive power output of photovoltaic inverters and the voltage intercept of each droop control function to minimize power loss while ensuring voltage constraints.

Does reactive power affect voltage regulation of PV inverters?

Proper control of reactive power of PV inverters can be of benefit to the overvoltage mitigation [8]. Nevertheless, only controlling reactive power is not able to yield the best voltage regulation because the reactive power control does not have a significant effect on voltage regulation [1].

Can local voltage control reduce overvoltage in PV inverters?

However, in local control, controllers can respond fast to distributed generation variability and are not affected by communication failures. Thus, local voltage control methods can mitigate the overvoltage using droop control curves in PV inverters, which are set offline in pre-operational studies.

Can PV inverters be decentralized?

The implementation of these methods requires the existence of a communication infrastructure for the electrical power grid. In distribution practice, most PV inverters simply use local droop control [10]. Therefore, acquiring the aforementioned resources would further increase the cost of transitioning to decentralized voltage control.

How to control overvoltage?

Therefore, an effective control methodology is essential to mitigate overvoltage issues and maximise the power outputs. There are various solutions that can deal with overvoltage problems, such as cable

reinforcement, transformer tap changer adjustment [6], active power curtailment (APC), and reactive power absorption (RPA) [7].

What are the state variables of a PV inverter?

In this paper, the bus voltage magnitudes, | Vi |, are used as the state variables; the output active power and reactive power of the PV inverters, , , are defined as the control variables, where illustrates the bus where the PV inverters are connected to.

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Assessment of overvoltage mitigation techniques in ...

The reactive power control technique consists of making the PV inverter to absorb or inject reactive power, in order to decrease or increase the voltage, respectively. As mentioned, this is achieved through the inverters, ...

A Small Photovoltaic Inverter Design Based on STM32 Controller and Soft

A small photovoltaic (PV) inverter design with a 500W output power rating that is based on an STM32 micro-controller together with soft-switching is proposed in this study. Aiming at the ...

Multi-input high step-up inverter with soft-switching capability

level inverter based on the switched-capacitor structure is introduced. In spite of generating an acceptable output voltage gain, this inverter suffers from inrush current in charging modes of ...

Novel Full Range Soft Switched Single Phase Inverter Design

and DC energy resources such as photovoltaic

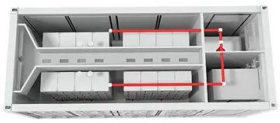
systems or battery storage systems in low-power residential applications. There has been a trend in the industry to increase the power high ...

Soft-switching SiC power electronic conversion for

To further increase the switching frequency of the inverter, the ZVS technique can be used in the SiC MOSFET PV inverter, as shown in Fig. 11. The ZVS inverter prototype in [19] shows a high efficiency of 98.6% at a 300 ...

Control and Intelligent Optimization of a Photovoltaic ...

An important technique to address the issue of stability and reliability of PV systems is optimizing converters' control. Power converters' control is intricate and affects the overall stability of the system because of the ...



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