

active or reactive power to the grid. On the other hand, injection of balanced reactive currents during unbalanced grid voltage sags may result in overvoltage of non-faulty phases [8-10]. Therefore, the design of the controller of the grid-connected inverter becomes more challenging during unbalanced grid voltage sags.

In addressing global climate change, the proposal of reducing carbon dioxide emission and carbon neutrality has accelerated the speed of energy low-carbon transformation [1,2,3]. This has stimulated the rapid development of solar energy, and the permeability of grid-connection photovoltaic (PV) has been increasing []. MPPT and inverter control strategy in a ...

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 interactions between different control loops inside the converter, parallel converters, and the power grid [4,5]. For a grid-connected PV system, ...

This paper investigates how to develop a two-stage voltage-type grid-connected control method for renewable energy inverters that can make them simulate the characteristics of a synchronous generator governor. Firstly, the causes and necessities of the failure zone are analyzed, and thus the traditional static frequency characteristics are corrected. Then, a novel ...

A typical two-stage grid-connected PV power system consists of solar PV modules, a front-end Boost converter and a back-end grid-connected inverter. Among them, the front-end converter is connected to the high and low voltage DC-link side, which makes the system work at the best efficiency point by controlling the maximum power point tracking of the ...

A variety of LVRT techniques have been formulated in the literature to deal with voltage dips in grid-interfaced PV systems. For single-stage photovoltaic networks, a novel LVRT control paradigm that simultaneously controls active and reactive current has been proposed in []. However, this strategy is comprised of numerous PI controllers, and the conventional dual ...

Reference proposed a control strategy of applying the adaptive PI controller to the neutral point clamped (NPC) inverter. The photovoltaic grid-connected NPC inverter has good robustness, but it is prone to the imbalance ...

The installation of photovoltaic (PV) system for electrical power generation has gained a substantial interest in the power system for clean and green energy. However, having the intermittent characteristics of photovoltaic, ...

5 Control techniques of grid tied inverters. The control of a grid-tied inverter is also so significant as it effects the proper operation of a grid-side inverter. It can be achieved by an accurate and fast control system both under balanced and un-balanced grid conditions. Actually there are two control modules of a PV module.

trollers [31, 33] for both current and voltage control of the PV inverter system. 2. Grid connected rooftop photovoltaic system Figure 1 shows the schematic diagram of a grid connected photovoltaic system. It includes two PV module, two DC- DC converters, inverter, controllers and the grid. The DC- DC converters along with an MPPT ...

A small PV system is usually connected to the grid through a DC/DC converter and a voltage source inverter (VSI). For achieving a good system performance and tracking the desired reference command, a proper control system is needed.

The high penetration level of solar photovoltaic (SPV) generation systems imposes a major challenge to the secure operation of power systems. SPV generation systems are connected to the power grid via power converters. ...

Kamel B, Djamel R (2014) Predictive direct power control for photovoltaic grid connected system: an approach based on multilevel converters. *Energy Convers Manage* 78:825-834 ... Model predictive control of grid-connected inverters for PV systems with flexible power regulation and switching frequency reduction. *IEEE Trans Ind Appl* 51(1):587 ...

Fig. 1 depicts the proposed control scheme of grid-connected PV system, where (a) shows abc to dq frame conversion unit, (b), (c) and (d) show positive, negative and zero sequence control algorithm and (e) shows schematic diagram of phase locked loop (PLL). PV array is connected to the grid through boost converter and inverter.

As the traditional resources have become rare, photovoltaic generation is developing quickly. The grid-connected issue is one of the most importance problem in this field. The voltage source inverter usually uses LC or LCL as the filter. LCL filter, which can reduce the required filtered inductance and save the cost, is adopted to connect the grid in this paper. ...

The central inverter topology, however, has several restrictions such as: (a) the losses in the string diodes, losses as a result of voltage mismatch, losses among PV modules, and centralized MPPT power losses, (b) interconnection of the PV modules and inverter requires a high voltage DC cables, (c) the line-commutated thyristors usually used in this topology ...

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Grid-connected voltage control of photovoltaic inverter