

Finally, the Matlab/Simulink simulation results show that the resonance suppression of photovoltaic grid-connected system can obviously improve the voltage waveform of the common bus, and make the ...

From Figure 19 and Figure 20, the validity of active damping equivalent to a capacitive current feeder is verified for resonance suppression. The PV grid-connected inverters used in engineering mostly have LCL filters, ...

In the current era of rapid clean energy technology advances, parallel operation of multiple grid-connected inverters emerges as a leading solution in microgrid systems. This study addresses resonance risks in parallel photovoltaic inverters, especially with LCL filters in weak grid environments, proposing an innovative resolution. Beyond establishing the system's ...

Grid-connected group-series photovoltaic cluster inverter system will cause resonance, which will adversely affect the system. To suppress grid-connected resonance, the mathematical model, resonance mechanism and resonance characteristics of the cluster inverters are analyzed, and a global resonance suppression strategy based on hybrid damping is ...

The harmonic characteristics of PV inverters in grid-connected operation are studied in this paper. Using the output impedance of PV inverters in the positive and negative sequence coordinate system, a passive impedance network of PV inverter grid-connected system is established, and the harmonic voltage amplification coefficient of PCC is ...

In order to suppress the resonance caused by the integration of photovoltaic inverter clusters into the grid, this paper proposes a photovoltaic inverter cluster resonance suppression strategy ...

Then, the grid connected resonance of large-scale wind farm and photovoltaic power station connected to half wavelength transmission system is studied by modal analysis method. The effects of transmission line length, the number of groups of wind power and photovoltaic inverters on typical modal harmonic resonance are analyzed.

Regarding the problems of resonance and direct current (DC) components when the Z-source inverter (ZSI) without an isolation transformer is connected to the grid through an LCL filter, this paper proposes a novel DC component suppression strategy for a grid-connected ZSI based on the split capacitor method of disturbance observer (DOB). The split capacitor ...

To reduce the influence of voltage harmonics on the grid current, a control strategy based on adaptive

quasi-proportional phase compensated resonance (QPR\_PC) is proposed. Firstly, the LCL grid-connected photovoltaic inverter system model is established, and the stability performance of the three-level inverter system under double closed-loop control is ...

3 Research on the Resonance Suppression Method. In order to solve the resonance instability problem of the multi-inverter parallel system, from the perspective of system global resonance suppression, it is necessary to extract the resonance signal in the system first and then use the resonance suppression unit installed at PCC for centralized treatment.

The resonance problem of multi-paralleled grid-connected inverters with inductance-capacitance-inductance (LCL) filters is a core matter which bothers the safety and stability operation of new energy distribution ...

In the field of grid-connected photovoltaic power generation, because the output PWM carrier of the inverter circuit is relatively low and the inverter circuit contains a large number of non-linear switching semiconductor devices, the three-phase grid-connected current is prone to distortion, which seriously affects the safe and reliable operation of the power system. The traditional PI ...

The traditional dual-control-loop strategy is widely used in grid-connected inverters. However, due to uncertain grid conditions, a resonance phenomenon may arise in systems and grid current can be badly distorted. In addition, the systems themselves may be unstable. In this paper, an equivalent impedance model of a grid-connected inverter is ...

This paper is focused on the case of grid-connected string PV inverter systems, and the grid-connected PV inverter resonance where resonance suppression strategy will be analyzed and discussed.

When a multi-inverter grid-connected system is influenced by the parasitic parameters of LCL-type inverters and the impedance of the connected system's lines, its resonance characteristics become more complex and difficult to predict. For LCL-type multi-inverter grid-connected systems, a mathematical model that considers the effects of parasitic ...

A resonance suppression method based on adaptive notch is proposed, which designs the traditional notch transfer function as a biquad function, and introduces the adjustment coefficients  $m_1$  and  $m_2$  to obtain different notch depths and bandwidths. Due to the non-negligible impedance of the long-distance transmission line, the string-type photovoltaic inverter cluster system will ...

In the current energy transition and grid modernization process, multi-machine grid-connected inverters [], as one of the key technologies, play an important role in the development of distributed generation, microgrids, and smart grids [].For example, Barkat et al. (2020) [] proposed a hybrid islanding detection method for multi-single-phase photovoltaic ...

Grid operating conditions have a significant effect on the harmonic and resonant performance of grid-connected photovoltaic (PV) inverters and changes in grid impedance can cause a notable ...

Obvious resonance peak will be generated when parallel photovoltaic grid-connected inverters are connected to the weak grid with high grid impedance, which seriously affects the stability of grid ...

To suppress grid-connected resonance, the mathematical model, resonance mechanism and resonance characteristics of the cluster inverters are analyzed, and a global resonance suppression strategy ...

Download Citation | Suppression of harmonic resonance for photovoltaic grid-connected inverter with LCL filter based on notch filter control | In order to analyze the mechanism of harmonic ...

2.1 Structure of Three-Level Grid-Connected Photovoltaic Inverter. The topology of a three-phase three-level grid-connected inverter is shown in Fig. 1.  $L_1$  represents the bridge arm inductance,  $L_g$  is the grid impedance,  $C_1$  is the return midpoint capacitor,  $C_2$  is the differential mode capacitor,  $i_L$  is the bridge arm current,  $i_g$  is the grid-side current,  $E$  is the ...

Obvious resonance peak will be generated when parallel photovoltaic grid-connected inverters are connected to the weak grid with high grid impedance, which seriously affects the stability of grid-connected operation of the ...

Obvious resonance peak will be generated when parallel photovoltaic grid-connected inverters are connected to the weak grid with high grid impedance, which seriously affects the stability of grid-c...

This paper analyses the benefits of the active damping applied to transformerless three-phase grid-connected photovoltaic (PV) inverters using modified LCL (MLCL) filter for leakage current reduction.

Abstract: In the current era of rapid clean energy technology advances, parallel operation of multiple grid-connected inverters emerges as a leading solution in microgrid systems. This ...

2 Resonance in the grid-connected inverter systems. Typically, grid-connected PV inverters operate at PWM switching frequencies in the range of 4-20 kHz, depending on factors such as the power converter topology, switching strategy and power level.

Grid-forming VSG is widely used due to its advantages such as active frequency/voltage support and self-organized network operation. The grid-forming under extremely weak power grids has good adaptability. As power grid intensity increase, grid-forming virtual synchronous generator (VSG) is prone to resonance. To enhance the ability of grid ...

sion eect for photovoltaic grid-connected system, this paper proposes an optimization method of active

# Photovoltaic grid-connected inverter resonance suppression

damping resonance suppression. The main contributions of this paper include the following three aspects. 1. The general structure of photovoltaic multi-inverter cluster grid-connected system is analyzed in this paper.

The output LC filter of a photovoltaic (PV) string three-level grid-tied inverter that connects the filter capacitor neutral point to dc-link capacitor neutral point can reduce the common-mode (CM ...

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