

Kongres Container

Dual closed-loop solar inverter



Overview

Is there a dual closed-loop repetitive control strategy for single-phase grid-connected inverters?

In this paper, a novel dual closed-loop repetitive control strategy based on grid current feedback is proposed for single-phase grid-connected inverters with LCL filters. The proportional-integral inner loop is stabilized by using an inherent one-beat delay achieved by digital controller.

How a solar inverter works?

The solution design includes bidirectional 3-phase DC-AC algorithms, and the maximum power point tracking (MPPT) DC-DC algorithm for solar panel control. The solar inverter has gained more and more attention in recent years. The solar inverter gets the solar energy input, then it feeds the solar energy to the grid.

What is a dual loop control method?

The repetitive dual-loop control method is adopted. The outer loop is controlled by the RC, which makes the grid-connected current i_g track the sinusoidal reference i_{ref} without a steady-state error. The PI control method is applied in the inner loop, which can increase the damping of the system to suppress the resonance peak.

What is the circuit topology of a single-phase grid-connected inverter?

The main circuit topology is a single-phase grid-connected inverter with LCL filter. The repetitive dual-loop control method is adopted. The outer loop is controlled by the RC, which makes the grid-connected current i_g track the sinusoidal reference i_{ref} without a steady-state error.

Is dual closed-loop control method better than other control methods?

Shown in Fig. 25 (d), harmonic content is very low and the output is 15.009A when using the dual closed-loop control method proposed in this paper. The

steady-state error is 0.18%. It is clear that the proposed control method has better steady performance than the other methods, and the THD is only 0.9%.

How does a DC-DC Solar inverter work?

This solution implements an isolated DC-DC stage with the MPPT algorithm, to make use of the full capacity of the solar panel. The solar inverter maintains its input voltage at the reference set point generated by the MPPT algorithm, and delivers power to a downstream DC-AC inverter when connected across its output.

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