Grid-connected inverter repetitive control

Can repetitive control reduce feed-in current harmonics in grid-connected inverters?
Abstract: The repetitive control (RC) scheme,which can achieve zero steady-state error tracking of any periodic signal with a known integer period,is widely employed in grid-connected inverters to mitigate feed-in current harmonics.

What is repetitive control in microgrids?
Author to whom correspondence should be addressed. Repetitive control (RC),which can track any periodic signal with a known integer period with zero steady-state error,is widely used for current control of grid-tied inverters in microgrids. However,the inherent one fundamental period time delay,leads to poor dynamic performance.

Do grid-connected inverters have a good power quality?
Abstract: The power quality of grid-connected inverters has drawn a lot of attention with the increased application of distributed power generation systems. The repetitive control technique is widely adopted in these systems, due to its excellent tracking performance and low output total harmonic distortion (THD).

Do grid-tied inverters have grid impedance fluctuations?
It is worth mentioning that,for the control methods of the grid-tied inverters considered in this paper,grid voltage magnitude fluctuations and grid impedance variations,which are common in distributed generation systems,are not taken into account.

Does adaptive repetitive control improve performance under grid frequency variation?
Though the improved RC scheme can minimise the period harmonic and has good dynamic response,it has poor performanceunder the grid frequency variation. To address the issues,a novel adaptive repetitive control (ARC) with frequency-adaptation and fast-transient capability based on is proposed in this paper.

Can a fixed sampling rate reduce injected current in grid-tied inverters?
This paper proposes an FA-IRC with a fixed sampling rate, to reject the harmonic components in the injected current of grid-tied inverters when grid frequency varies. The control strategy is based on a novel improved repetitive control.

Repetitive control can be effective in improving current quality when used with grid-connected inverters. Mathematically, a repetitive controller is equivalent to a parallel combination of ...

Applied in the grid-connected inverter, the internal-model based repetitive control usually features that the delay time is designed according to the nominal grid-frequency.

In DGSs and MGs, the grid-connected inverters (GCIs) are essential interfaces to connect RESs and energy

storage devices to utility grid [15], [16].To reduce the investment, operation and maintenance cost, man-hour, as well as the bulk, and enhance the cost-effective feature of the GCIs in DGSs and MGs, the multi-functional grid-connected inverters (MFGCIs) ...

The main idea of this paper is to develop a composite control including a PI control and repetitive control for a single-phase grid-connected inverter to eliminate the effects of harmonics, which ...

This paper proposes a cascade repetitive control strategy based on odd internal mode, and combines it with proportional-integral (PI) control to establish a compound repetitive control system for improving the quality of grid connected current of LCL grid connected inverter. More specifically, the proposed method could effectively improve the control effect of grid-connected ...

This study is concerned with control of grid connected inverters using odd-harmonic repetitive scheme. Owing to the inherent long convergence period of repetitive control, a feedforward loop of the fundamental component of the grid voltage is used to make sure that the inverter"s output current is bounded during the convergence period.

This paper proposes a repetitive control scheme for grid-connected inverters ...

However, this control approach requires the measurement of all system state variables, which brings about more complexity for the inverter system. To address this issue, this paper presents a systematic procedure to design an observer-based integral state feedback control for a LCL-filtered grid-connected inverter in the discrete-time domain.

The utilization of multilevel inverters in grid-connected photovoltaic systems is ...

This study presents two-stage inverter topology for single-phase grid-connected photovoltaic (PV) applications and its control implementations. The two-stage systems are reliable and work well. Typically, the second stage ...

Model predictive control (MPC) is a well-established approach for applications using grid-connected inverters. However, because the MPC is a model-based method, its performance may degrade due to parametric errors and large perturbations in grid voltage or load current. Predictive repetitive control (PRC) combines the conventional MPC with repetitive control (RC) and ...

The frequency response diagram of the stability criterion of proportional and repeated control under the change of power grid impedance is shown in Fig. 4, from which we can see.The frequency response vector curve of the control system is located outside the cell circle in the frequency range 71.9Hz to 96.5Hz, which will make the control system amplify the ...

The main idea of this paper is to develop a composite control including a PI control and repetitive control for a

single-phase grid-connected inverter to eliminate the effects of harmonics, which can obtain better steady-state and ...

Block diagram of a single-phase grid-connected inverter with the proposed repetitive control strategy

With the growth of energy demand and the aggravation of environmental problems, solar photovoltaic (PV) power generation has become a research hotspot. As the key interface between new energy generation and power grids, a PV grid-connected inverter ensures that the power generated by new energy can be injected into the power grid in a stable and safe way, ...

Repetitive control (RC), which can track any periodic signal with a known integer ...

The repetitive control (RC) scheme, ... (FA-PRC) scheme provides grid-connected inverters with a control solution with excellent dynamic performance and accurate frequency adaptability to eliminate harmonic distortion even in the presence of grid frequency variations. A comprehensive series of experiments have demonstrated the effectiveness of ...

Due to its resonant peak characteristics, the repetitive control has a narrow effective gain bandwidth and is sensitive to network-side frequency fluctuations. Due to the switching of high-power new energy power generation system, the operating frequency of the power system will fluctuate between 49.5-50.5Hz, which will greatly reduce the working performance of the grid ...

The proposed frequency adaptive PRC (FA-PRC) scheme provides grid-connected inverters ...

Keywords: Distributed Generator (DG), Grid Connected Converters, Current Control, Repetitive Controller (RC) Abstract This paper discusses the design of a repetitive feedback controller for a grid-connected two-level three-phase voltage-source inverter connected between a DC source and the grid through an LCL filter.

This paper is organized as follows: In Section 2, we introduce the single-phase inverter type and modelling Section 3, a first-order repetitive control and high-order repetitive control are introduced based on the proposed ...

A strategy of PI + repetitive control for LCL-type photovoltaic ... type grid-connected PV inverter and analyzing the influ-ence of grid current with respect to the grid voltage har-monics. The optimization scheme can simplify coordinate transformation and decoupling work. To a great extent,

A repetitive predictive control for grid-connected inverter current control scheme is presented in this paper under voltage harmonic distortion in the stationary reference frame. Predictive control is an approach that uses a receding horizon to achieve the optimal track for the reference. In this approach, the repetitive controller behavior is added to the predictive control ...

5.4.2 Steady-state Performance in the Grid-connected Mode 119 5.4.3 Transient Response: without a Local Load 120 5.4.4 Response to Variations of the Grid Frequency 120 5.5 Summary 126 6 Cascaded Current-Voltage H? Repetitive Control 127 6.1 Operation Modes in Microgrids 127 6.2 Control Scheme 129 6.3 Design of the Voltage Controller 131

In a grid-connected PV system, the inverter controls the grid injected current to set the dc link voltage to its reference value and to adjust the active and reactive power delivered to the grid. In this review paper, different current control strategies for grid-connected VSI with LCL filter are introduced and compared.

The Second-Order 6k±1-Order Repetitive Control for Three-Phase Grid-Connected Inverter Abstract: The conventional repetitive control (CRC) cannot obtain ideal control performance when a large number of renewable energy are connected to the new power system.

This paper proposes a repetitive control scheme for grid-connected inverters that can track changes in grid frequencies and keep resonant peaks lined up with grid frequency harmonics. The proposed controller is implemented using a digital signal processor. ... Grid-connected inverter. Repetitive control (RC) is widely used in many practical ...

This study is concerned with control of grid connected inverters using odd ...

Key words: Keywords:Grid-connected inverter, repetitive control, PI control, composite control :?? : :210096 :025-83794925 : Email:dzcg-bjb@seu .cn ; dzcg-bjb@163

With the proposed method, grid-connected inverters can work stably when grid impedance changes suddenly and exhibit strong rejection ability against grid-voltage harmonics. Finally, simulative and experimental results from a 3-kW single-phase grid-connected inverter are provided to prove the effectiveness of the proposed strategy.