

Why is Inverter management important in grid-connected PV systems?

Proper inverter management in grid-connected PV systems ensures the stability and quality of the electricity supplied to the grid. An appropriate control strategy is necessary to ensure reliable performance over diverse system configurations and fluctuating environmental conditions.

Can artificial ecosystem optimization improve PI controller parameters for a grid-connected photovoltaic system?

In this research, we suggested and put into practice the Artificial Ecosystem Optimization (AEO) algorithm to fine-tune the PI controller parameters for a grid-connected photovoltaic (PV) system, aiming to enhance the system's power quality, stability, and overall performance through dynamic real-time adjustments.

What is a single phase PV Grid connected inverter?

2. Single-Phase PV Grid-Connected Inverter Control Strategy The output of the grid-connected inverter adopts the current control mode. Actually, the grid-connected system and the grid are AC sources and voltage sources in parallel. The output voltage of the inverter is automatically clamped to the grid voltage.

Can PI control improve a grid-connected current waveform?

Literature proposes a current-tracking control strategy combining repetitive control and PI control, which can effectively improve the grid-connected current waveform and ensure that the inverter output current and grid voltage are with the same frequency and phase, but their dynamic response is poor.

In this paper we investigate the influence of the grid impedance, and various control parameters of a GFM inverter with PI current controllers and virtual impedances, and ...

A 2.1 kW grid-connected photovoltaic (PV) system with a single-phase configuration is developed in MATLAB/Simulink to apply a proposed firefly algorithm for ...

This paper presents optimization approaches that are essential for designing the most efficient proportional-integral (PI) controller for power converters in grid-connected PV ...

A great technical concern of synchronization is presently raised by the recent integration of converter interfaced generators into the convention grid. While there are various ...

Abstract To ensure that grid-connected currents are of high quality, it is crucial to optimize the dynamic performance of grid-connected inverters and their control. This study ...

First, a mathematical model of the grid-connected inverter is established, and the D-segmentation method is

employed to analyze the stability region of conventional PI control ...

In a grid-connected power generation system, the grid-connected current of the inverter is sensitive to nonlinear factors such as ...

Abstract: Grid-connected photovoltaic systems require a control technique to minimize the Total Harmonic Distortion (THD) in current and voltage. In this work, the ...

For several years, the focus of recent research has been on solar power and distributed generation (DG) systems, these systems have been widely used in various ...

Hybrid fuzzy logic-PI control with metaheuristic optimization for enhanced performance of high-penetration grid-connected PV systems Article Open access 09 July 2025

In addition, to handle weak-grid conditions, the proposed scheme is expanded by including the compensation unit in the grid's feed-forward loop. Finally, an experimental ...

A 100 KW grid-connected PV power is implemented in the MATLAB/Simulink with constant irradiance and temperature at 1000 W/m² and 25 C, respectively, to implement the proposed ...

The main objective of the proposed strategy is to improve the power quality performance of the three-phase grid-connected inverter ...

In a grid-connected power generation system, the grid-connected current of the inverter is sensitive to nonlinear factors such as periodic disturbance of grid voltage, which ...

This study applies Genetic Algorithm-based optimization to enhance the control of grid-connected inverters in distributed generation systems by developing a PI current control ...

This paper presents the performance of a control strategy for an inverter in a three-phase grid-connected PV system. The system ...

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