Photovoltaic inverter without phase-locked loop

Do three-phase inverters need grid voltage phase detection?
Abstract: Three-phase inverters for grid-connected applications typically require some form of grid voltage phase detectionin order to properly synchronize to the grid and control real and reactive power. This phase detection is usually based upon some type of grid voltage sensing.

Can grid-following inverters regulate power exchange with the grid?
Abstract: This paper proposes a power-synchronized control strategy for grid-following inverters (GFLIs) to regulate their power exchange with the grid without any need for sensing/regulating the point of connection voltage.

Is there a phase-locked loop in a grid current-control scheme?
However,in this work,a method is proposed,whereby the phase angle of the grid can be accurately identified solely via the grid current feedback. In the proposed current-control scheme,the only measurement is the output inverter current,and no phase-locked loop(PLL) exists within the scheme.

What is a phase-locked loop (PLL) in a current-control scheme?
In the proposed current-control scheme,the only measurement is the output inverter current,and no phase-locked loop (PLL) exists within the scheme. This phase observeris incorporated into a current controller,which can manage the injected power to the grid.

How does a closed-loop control system work?
To summarize,this scheme archives current control for a grid-connected inverter using only current feedback. In comparison,traditional methods require voltage and current feedback along with a PLL to synchronize with the grid creating a cascaded closed-loop control system.

A variety of work has been found in literature in the field of closed loop current controlling. Some of the work includes PV parallel resonant DC link soft switching inverter using hysteresis current control by [], which is carried out by using a hysteresis current controller, in which voltage controlling is done by proportional-integral (PI) controller, comparator, and a DC ...

500 W dual-channel single-phase PV grid-connected micro-inverter and 5 kW single-phase PV grid-connected inverter respectively. The results show that the proposed software phase-locked loop can achieve the voltage phase tracking and frequency locking well, thus verifying the pro-posed control method for single phase-locked loop. Keywords ...

In this article, Our work focused on the design of a photovoltaic grid-connected system using a controller for monitoring the maximum power point of the PV farm (MPPT) of type (P& O), a phase locked loop (PLL) in

order to ensure synchronization with the grid and thus ensuring correct generation of the reference, two voltage and current regulation loops ...

DOI: 10.1109/JESTPE.2019.2953522 Corpus ID: 209906546; Grid Integration of a Dual Two-Level Voltage-Source Inverter Considering Grid Impedance and Phase-Locked Loop @article{Aghazadeh2021GridIO, title={Grid Integration of a Dual Two-Level Voltage-Source Inverter Considering Grid Impedance and Phase-Locked Loop}, author={Amir Aghazadeh and ...

Abstract: This article presents a robust and efficient control scheme for single-phase photo-voltaic (PV) grid-tied voltage source inverter. A hybrid phase-locked loop is ...

The PI regulator can be used to form a double closed-loop control loop without a phase-locked loop section, thus realizing the non-differential regulation of the DC power component. ... of which there are 1700 inverters. PV power units are connected to the grid via box transformers and main transformers, and the PV plant operates at full power.

The proposed strategy allows for flexible active and reactive power injection into the grid during asymmetrical voltage sags without using a phase-locked loop or positive and ...

A robust control scheme for grid-connected photovoltaic converters with low-voltage ride-through ability without phase-locked loop. Author links open overlay panel Adeel Sabir a, Salim Ibrir b. Show more. ... Control strategy of three-phase photovoltaic inverter under low-voltage ride-through condition. Math Probl Eng, 2015 (2015), pp. 1-23, 10 ...

This work presents an improved phase-locked loop (IPLL)-based control for grid-integrated photovoltaic (PV) system (GIPVS). It is used to extract amplitude, frequency, and phase angle of distorted ...

In traditional grid-connected photovoltaic inverters, the SPWM signal generation process is complex and inflexible, and the phase-locked loop is easily affected by grid fluctuations and voltage waveform distortion. Based on that, a phase-locked loop control strategy...

DOI: 10.3390/electronics10243095 Corpus ID: 245195471; Fuzzy Logic-Based Direct Power Control Method for PV Inverter of Grid-Tied AC Microgrid without Phase-Locked Loop @article{Ahmad2021FuzzyLD, title={Fuzzy Logic-Based Direct Power Control Method for PV Inverter of Grid-Tied AC Microgrid without Phase-Locked Loop}, author={Shameem ...

PLL Based Photovoltaic System of LCL Three-Phase Grid Connected Inverter with and Without SVPWM Technique ... a phase locked loop (PLL) based algorithm and a current control feedback technique is employed in the circuit with the help of Direct-Quadrature (dq) theory and PWM techniques like Space vector pulse width modulation (SVPWM) and ...

Photovoltaic inverter without phase-locked loop

A robust control scheme with low-voltage ride-through ability is presented for grid-connected photovoltaic converters that operate under harsh conditions such as voltage sags and unknown disturbances and parameters. The proposed strategy allows for flexible active and reactive power injection into the grid during asymmetrical voltage sags without using a phase ...

of Type-3 Phase Locked Loop withou t compromising the Benefit s of Type-2 Control S ystem," IEEE Transact ions on Powe r Electronics, vol. PP, no. 99, pp. 1-1, 20 17.

This paper proposes a PLL-less Vector Control (PLVC) method in which a single-phase Grid connected inverter is controlled without any PLL. Hence it reduces the ...

Keywords: phase-locked loop, PV inverter, aquila optimizer, power fluctuation, solar energy. Citation: Guo Z, Yang B, Han Y, He T, He P, Meng X and He X (2022) Optimal PID Tuning of PLL for PV Inverter Based on Aquila Optimizer. Front. Energy Res. 9:812467. doi: 10.3389/fenrg.2021.812467.

Ahmad, Shameem and Mekhilef, Saad and Mokhlis, Hazlie and Karimi, Mazaher and Pourdaryaei, Alireza and Ahmed, Tofael and Jhuma, Umme Kulsum and Afzal, Suhail (2021) Fuzzy logic-based direct power control method for PV inverter of grid-tied ac microgrid without phase-locked loop. Electronics, 10 (24).

Fuzzy Logic-Based Direct Power Control Method for PV Inverter of Grid-Tied AC Microgrid without Phase-Locked Loop. Hazlie Mokhlis. ... Electron. 2019, 34, 8299-8303. [CrossRef] Thao, N.G.M.; Uchida, K. Control the active and reactive powers of three-phase grid-connected photovoltaic inverters using feedback linearization and fuzzy logic. In ...

Abstract: This paper proposes a power-synchronized control strategy for grid-following inverters (GFLIs) to regulate their power exchange with the grid without any need for sensing/regulating ...

Grid-Connected LCL Inverters without a Phase-Locked Loop Lin Zhou+, Ming Yang*, Qiang Liu*, and Ke Guo* +*State Key Laboratory of Power Transmission Equipment & System Security and New Technology, Chongqing University, Chongqing, China Abstract The three-phase synchronous reference frame phase-locked loop (SRF-PLL) is widely used for ...

Fuzzy Logic-Based Direct Power Control Method for PV Inverter of Grid-Tied AC Microgrid without Phase-Locked Loop. Electronics, 10(24), 3095. https://doi /10.3390/electronics10243095

For single-phase grid connected inverter, based on the traditional closed-loop structure of three-phase phase-locked loop (PLL), an improved software PLL was proposed.

Closed-loop techniques involves frequency lock loop (Golestan et al., 2019) and phase lock loop PLL

(Golestan et al., 2013b;Hariri et al., 2020; Kamil et al., 2020). PLL is the most popular used ...

The stability and dynamic performance of the grid-connected converter is greatly affected by the coupling between the phase-locked loop (PLL) and the current loop control under weak grid conditions. The traditional control strategies use PLL to obtain the frequency and phase of the grid, which ignore the influence of the PLL and cannot adapt to weak grid ...

This paper proposes a control strategy for grid-following inverter control and grid-forming inverter control developed for a Solar Photovoltaic (PV)-battery-integrated microgrid network. A grid-following (GFL) inverter with ...