DSP-based three-phase grid-connected photovoltaic inverter

Can a DSP-based controller improve the efficiency of a grid-connected photovoltaic system?
An improved DSP-based controller with predictive and fuzzy logic-based current controller is investigated in . The contribution of power electronics on the efficiency improvement and current harmonics reduction in the grid-connected photovoltaic system is described in [18, 19, 20, 21].

What is a DSP based active and reactive power control scheme?
This study presents a DSP based active and reactive power control scheme consisting of a maximum power point tracker(MPPT) and grid-tied three phase inverter to transfer the maximum possible power from Photovoltaic (PV) panels for grid system. The first subsystem consists of a current controlled boost converter to track MPPT.

Should grid code regulation be followed when integrating a PV inverter system?
Grid code regulation must be followedwhen integrating the photovoltaic inverter system to the grid. The paper investigates and analyzes a controller model for grid-connected PV inverters to inject sinusoidal current to the grid with minimum distortion.

Is diode-clamped topology used in three phase three level grid connected inverter?
In this article,the diode-clamped topology is used in three phase three level grid connected inverter. However,various strategies of modulation techniques and control schemes are implemented in multi-level diode-clamped grid connected inverter system.

Can a grid-connected PV inverter inject sinusoidal current to the grid?
The paper investigates and analyzes a controller model for grid-connected PV inverters to inject sinusoidal current to the grid with minimum distortion. To achieve better tracking and disturbance rejection,a DSP-based current controller is designed with LCL filter.

How is inverter power fed to the grid?
Inverter power is fed to the grid in phase with the grid voltage. The proposed current controller comprises zero crossing detector for phase and frequency of the grid voltage. Reference current calculation is done to deliver maximum available power to the grid.

The proposed multi-level inverter uses a carrier based space vector pulse width modulation scheme in order to produces the desired output voltage. ... Hongwei Zhou, Jing Ren, Weizeng Liu, Shaohua Ruan and Yongjun Gao, Three-Phase Grid- Connected Photovoltaic System with SVPWM Current Controller, 2009 IEEE. [7] P.Thirumuraugan and R.Preethi ...

To achieve better tracking and disturbance rejection, a DSP-based current controller is designed with LCL

filter. ... Mohan SN, Sahoo SK, Panda SK (2011) Derivation of instantaneous current references for three phase PV inverter connected to grid with active and reactive power flow control Proceedings of the IEEE International Conference on ...

Journa l of Electr ica l Eng ineer ing, 2004, 55 (3 - 4): 77 âEUR" 82 [8] WANG TCY, YE Zhi2hong, GAUTANM S, et al. âEURoeOutputf ilter design for a grid-interconnected three-phase inverter âEUR [C]//IEEE PESCp03, 2003: 779 âEUR" 784 invcurrentgrid12 u g i o 0.0 0.0 200 400 10.0 - - 400 10.0 i o /A u g /V 200 - doing phase-locked ...

Shayestegan, M. et al. An overview on prospects of new generation single-phase transformerless inverters for grid-connected photovoltaic (PV) systems. Renew. Sustain. ...

Estimating the phase angle of grid plays a crucial role in grid interactive inverter in order to be synchronized the inverter and the grid. Phase locked loop (PLL) method is usually used in ...

Other alternative controllers are given in the discrete time state space based on digital signal processors (DSP) (Panten, N. et al., 2016, Kim, S.-K et al., 2015, James, S. et al., 2015) has been proposed. ... SYSTEM DESCRIPTION 2.1 Mathematic Model A topology of the three-phase grid connected inverter with the LCL filter is shown in Figure 1 ...

The paper investigates and analyzes a controller model for grid-connected PV inverters to inject sinusoidal current to the grid with minimum ...

Abstract: Aiming at the topology of three phase grid-connected inverter, the principle of dq-axis current decoupling is deduced in detail based on state equation. The current loop regulation ...

This paper proposes a three-phase isolated flyback inverter (IFBI) for single-stage grid-tied solar PV applications, considering a simple sinusoidal pulse-width modulation (SPWM) scheme. The proposed single-stage inverter ...

The installation of photovoltaic (PV) system for electrical power generation has gained a substantial interest in the power system for clean and green energy. However, having the intermittent characteristics of photovoltaic, its integration with the power system may cause certain uncertainties (voltage fluctuations, harmonics in output waveforms, etc.) leading ...

This study presents the experimental results of a DSP based active and reactive power flow control algorithm for a grid-tied three-phase PV inverter. Maximum power transfer ...

In this article, the multi-level converter was constructed as a 2 kW output power of the 3 phase 3 level diode clamped grid connected inverter. The proposed multi-level inverter ...

DSP-based three-phase grid-connected photovoltaic inverter

The double loop control of a three-phase PV grid-connected inverter based on LCL filter is described in [40]. The inverter current feedback is used as inner loop and passive damping method is selected for resonance damping. In [41], a two-stage interfacing system is used for connecting a PV system to the grid. It contains an adaptive fuzzy ...

grid-connected three-phase 3-level Neutral Point Clamped (NPC) inverter for Building Integrated Photovoltaic (BIPV) systems. The system consists of a PV array, boost DC/DC converter, 3-level NPC inverter, LC filter and the grid. The 3-level NPC inverter is designed without a galvanic isolation transformer and

The inverter used is a three-phase two-level inverter. The control structure for inverter is designed in synchronous reference frame. PLL extracts the necessary information of grid voltage phase. The grid has a Line to Line voltage of 400Vrms. An LCL filter is used to interconnect inverter output to the grid.

As an alternative to using programming language, dSPACE control board has been developed. This board enables to use MATLAB/Simulink for programming the DSP. In the literature, dSPACE DS1104 is used for fuzzy logic controlled three-phase photovoltaic grid-connected inverter [5] and current source inverter for PV applications [6].

This study presents a DSP based active and reactive power control scheme consisting of a maximum power point tracker (MPPT) and grid-tied three phase inverter to transfer the maximum...

DSP based implementation has the most usage in credible scientific articles. ... Zhang H, Hongwei Z, Ren J, Liu W, Ruan S, Gao Y. Three-phase grid-connected photovoltaic system with SVPWM current controller. In: IEEE 6th international power electronics and motion control conference. 2009. pp. 2161-2164. ... Sliding-mode control of PWM dual ...

This paper makes a proposal for a 50kW single-stage solar system which is PWM based DC-AC converter with a three-phase grid connection with a combined power of 53kw at 1000w/m 2 irradiation by ...

In this paper, a novel grid voltage sensor-less operation of the generalized three-phase grid connected distributed generating source based inverter operation is proposed.

MPPT and the grid-tied three phase inverter are controlled with TMS320F28335 DSP. Both the boost converter and the three phase inverter outputs are limited to prevent the damage on the circuits. To measure line voltage and current, voltage and current sensors are used. The isolation of the inverter is required for the system safety.

The PV array is connected to the grid via a three-phase voltage-source two-level inverter and an LCL filter. The capacitors of the LCL filter can be configured with a delta or star connection. In this paper, a star

connection is used to reduce the required capacitance and cost as opposed to the delta connection, which has the benefit of smaller ...

High quality model predictive control for single phase grid-connected photovoltaic inverters. Author links open overlay panel Esmaeil ... DSP-based implementation of a self-tuning fuzzy controller for three-level boost converter ... Adaptive robust predictive current control for three-phase grid-connected inverters. IEEE Trans. Ind. Electron ...

This chapter deals with the DSP control of three-phase voltage source inverters. A study on a 10-kW grid-connected photovoltaic inverter with two control options, namely, the ? ...

An improved control strategy for the three-phase grid-connected inverter with space vector pulse-width modulation (SVPWM) is proposed. When the grid current contains harmonics, the d- and q-axis grid currents will be interacted, and then the waveform quality of the grid current will be poorer.As the reference output voltage cannot directly reflect the change of the ...

Aiming at the topology of three phase grid-connected inverter, the principle of dq-axis current decoupling is deduced in detail based on state equation. The current loop regulation and the three phase grid-connected control system based on grid voltage orientation are simulated by using Matlab/Simulink. The experimental platform is built with DSP as the control core, and the off ...

Fig. 1: The topology of three-phase grid-connected power generation systems. To design the current controller, a nominal model that represents the dynamics of the three-phase inverter, transformer, filter and grid is first derived. In this system, the magnetizing current of the transformer can be regarded

inverter input side and the PV array and is then connected to the grid through the transformer as Energies 2020, 13, 4185; doi:10.3390 / en13164185 / journal / energies Energies ...

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