



ANALYSIS OF PHOTOVOLTAIC POWER IN SOLAR AND CONNECTING GRID SYSTEM TO PI CONTROLLER

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ABSTRACT:

The yield force of PV module changes with module temperature, sunlight based light and loads. What's more, with a specific end goal to rapidly and precisely track the sun, it is important to track the most extreme force point (MPP) constantly. An enhanced greatest force point following (MPPT) with better execution in view of voltage situated control (VOC) is proposed to take care of a quick changing light issue. In VOC, a fell control structure with an external dc join voltage control circle and an inward current control circle is utilized. The MPPT controller is connected to the reference of the external circle control dc voltage photovoltaic (PV). In this venture, the primary segment of the single-stage lattice associated PV framework is the three-stage voltage source inverter (VSI). The voltage-situated control (VOC) strategy utilized for VSI utilizes an external dc join voltage control circle and an inward current control circle to accomplish quick element reaction. The execution of the force stream depends to a great extent on the nature of the connected current control technique. In this venture, the present control has been executed in a pivoting synchronous reference outline d, q on the grounds that the controller can wipe out a consistent state mistake and has quick transient reaction by decoupling control. The vigorous following capacity under quickly expanding and diminishing irradiance is confirmed in reenactments. Reenactment results on a vast scale matrix associated PV framework demonstrate the viability of the proposed control plan as far as conveying greatest force into the network under variable conditions.

Keywords:- Fast-changing irradiation, maximum power point (MPP) tracking (MPPT), proportional–integral (PI) control, voltage-oriented control (VOC).

1. INTRODUCTION:

Because of worldwide worry on environmental change and maintainable electrical power supply, renewable vitality is progressively getting prominent in the created nations. Among various wellsprings of renewable vitality, PV framework is a promising vitality source in the late years as PV establishments are expanding because of their surroundings inviting operation [1]. Lattice associated PV framework has picked up fame because of the food in-tax and the decrease of battery expense. Be that as it may, the discontinuous PV era fluctuates with the change in environmental conditions. Most extreme force point attaching (MPPT) methods [2] are utilized to convey greatest force into the matrix. Productive and propelled control plans are vital to guarantee most extreme force yield of a PV framework at various working conditions.

Usage of legitimate controllers on a network associated PV framework keep up the steady operation under unsettling influences like the change in environmental conditions, change in burden requests, or an outside flaw inside of the framework. This should be possible by directing the exchanging signal through the inverter, i.e., if an appropriate controller is connected through the inverter of the framework, then the fancied exhibitions will be gotten. Various strategies are accessible in the writing for planning the MPPT [3]. Annoy and watch (PO) [4], and incremental conductance strategy are generally utilized methods as a part of the territory of photovoltaic frameworks. In the PO strategy, the subordinate of force (dp) and the subsidiary of voltage (dv) should be measured to decide the development of working point. In the event that the

proportion of dp and dv is sure, the reference voltage is expanded by a specific sum and the other way around [5]. A comparative methodology is taken after for incremental conductance technique by contrasting incremental conductance and immediate conductance of the PV clusters [6].

The significance of DC voltage control for a framework associated PV framework can be found in [1]. In [1] a model expectation based voltage controller is proposed to enhance the unwavering quality and lifetime of the inverter and to upgrade execution of the MPPT through the diminishment of DC connection capacitance. As of late, an enhanced MPPT in view of voltage-situated control is proposed in [8] by utilizing a relative necessary (PI) controller in the external DC join voltage circle. Current controllers are utilized to keep up stable operation of a matrix associated PV framework as they can direct the current to take after the reference current. There are a few procedures to control the current, for example, PI controller, hysteresis controller, prescient controller, sliding mode controller, et cetera. In [9], PI current control plan is proposed to keep the yield current sinusoidal and to have quick element reactions under quickly changing environmental condition and to keep up the force variable at solidarity. The trouble of utilizing a PI controller is to tune the increase with the change in environmental conditions. The hysteresis controller as proposed in [1] has quick reaction by shifting exchanging recurrence. The prescient controller [11] beats the restriction of hysteresis controller as it has consistent exchanging recurrence yet the principle issue connected with this controller is that it can't legitimately coordinate with the current issues identified with the change in natural variables.

Lattice associated PV frameworks are profoundly nonlinear frameworks where the vast majority of the nonlinearities happen because of the irregularity of the daylight, the exchanging elements of the converters and inverters. The dynamic dependability of a framework associated PV framework is broke down in [1], [3] in view of the eigenvalue examination. In [2], [3], no controller is proposed to upgrade the soundness of PV framework. In any case, the controllers proposed in [6] are for the most part planned in view of the linearized model of photovoltaic framework which can give tasteful operation to a predefined set of changes. To guarantee the operation of grid connected photovoltaic frameworks over an extensive variety of working focuses, the outline and execution of a nonlinear linearized. At the point when the framework is somewhat linearized, definite linearization is not any more material.

Whatever is left of the paper is composed as takes after. The scientific model of a three-stage lattice associated PV framework is appeared in Section II. Segment III introduces the fractional linearizability of PV framework to demonstrate the suitability of the proposed model for zero element outline approach. The controller outline for a three-stage network associated photovoltaic framework is appeared in Section IV and connection of MPPT with the proposed control plan is appeared in Section V. Segment VI demonstrates the reenactment results with the proposed controller under various circumstances.

2. ORIGIN OF LOWER ORDER HARMONICS AND FUNDAMENTAL CURRENT CONTROL

This segment talks about the starting point of the lower request music in the framework under thought. The wellsprings of these sounds are not demonstrated as the strategy proposed to lessen those works free of the consonant source.

A. Origin of Lower Order Harmonics

1)Odd Harmonics: The prevailing foundations for the lower request odd sounds are the contorted polarizing current drawn by the transformer, the inverter dead time, and the semiconductor gadget voltage drops. Different components are the twisting in the lattice voltage itself and the voltage swell in the dc transport. The polarizing current drawn by the transformer contains lower request sounds because of the nonlinear attributes of the B–H bend of the center.

2)Even Harmonics: The topology under thought is exceptionally touchy to the vicinity of dc counterbalance in the inverter terminal voltage. The dc counterbalance can enter from various variables, for example, shifting force reference given by a quick MPPT square[5].

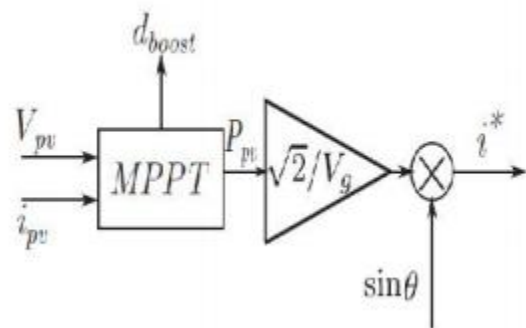


Figure 1: Generation of an inverter ac current reference from an MPPT block.

In Fig. 1, is the duty ratio command given to the boost converter switch, and are the panel voltage and current respectively.

B. Fundamental Current Control

1) Introduction to the PRI Controller:

Routine stationary reference outline control comprises of a PR controller to create the inverter voltage reference. an adjustment to the PR controller is proposed, by including a fundamental square, GI as demonstrated in Fig. 2. The changed control structure is termed as a PRI controller.

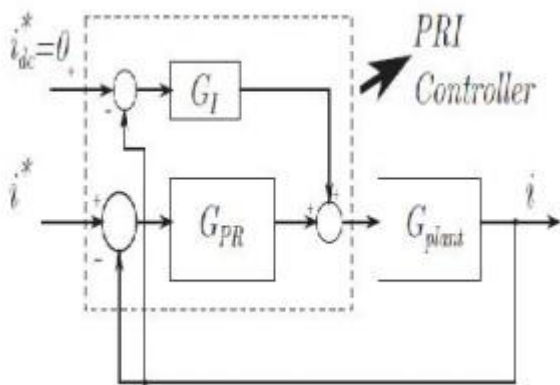


Figure 2: Block diagram of the fundamental current control with the PRI controller.

3. LITERATURE SURVEY

Mouhanned Brahim, Jamel Belhadj(2013) A lot of examination is being done to enhance the execution of photovoltaic (PV) lattice associated frameworks. This paper shoes the execution of a 1kW PV network associated framework under matrix disappointment. conditions. Hypothetical, recreations, and test result shoes the execution of the proposed system.[1]

Bahadur Raut(2013) The goal of this work to think about the execution investigation of lattice associated sun powered PV framework. To perform this, the numerical displaying of 1kWp lattice associated framework is done and the force profile is assessed

utilizing chronicled ecological information gathered over various years at Kathmandu. Distinguished the conceivable operational issues that may emerge in lattice associated PV framework and diverse systems that can moderate these issues are contemplated. Also, the execution of the framework is evaluated.[3]

Reproduction and trial results for private close planetary system with force electronic converters and examination have been introduced in this paper keeping in mind the end goal to demonstrate the proposed algorithm.[5]

temperature and irradiance, feasible productivity, and usage considerations.[8]

Basic Circuit Diagram

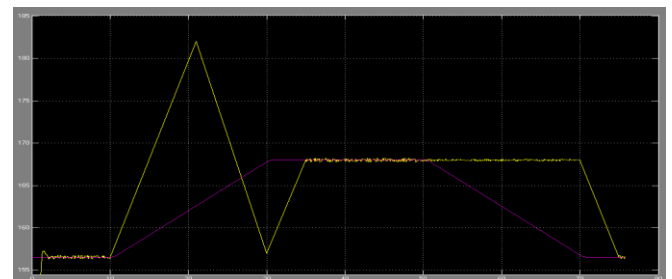
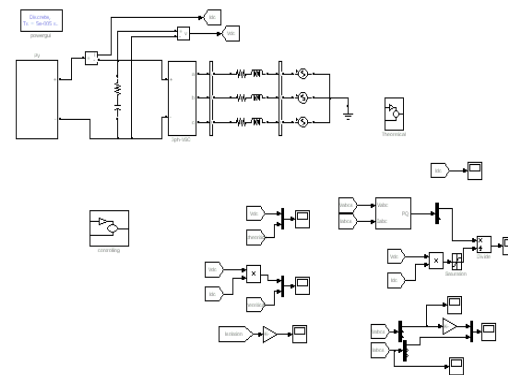


Fig 12

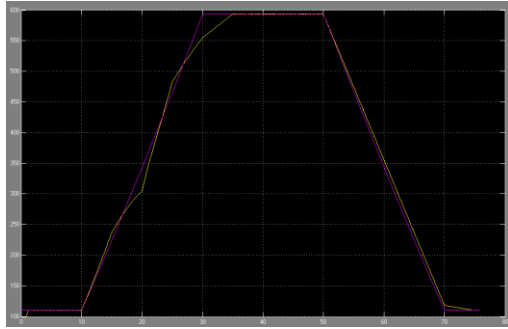


Fig 13

Fig 14

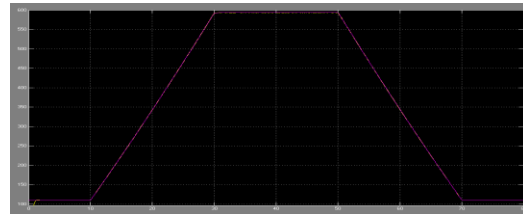


Fig 15

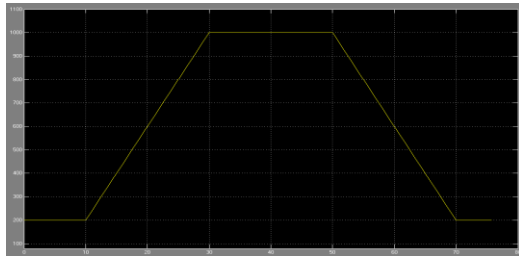


Fig 16a

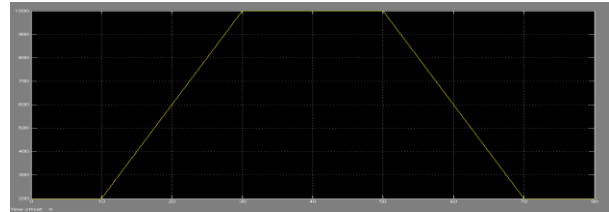


Fig 17a

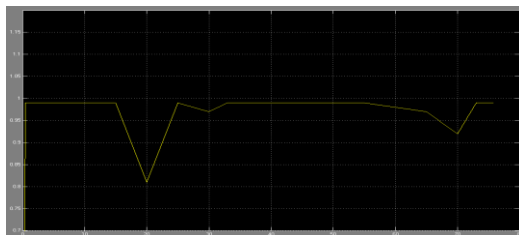


Fig 16b

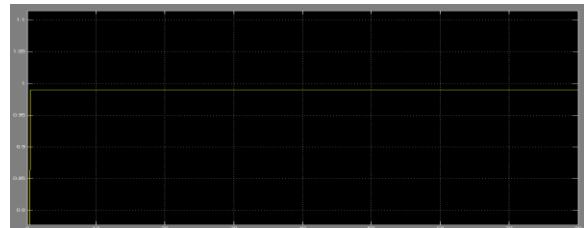
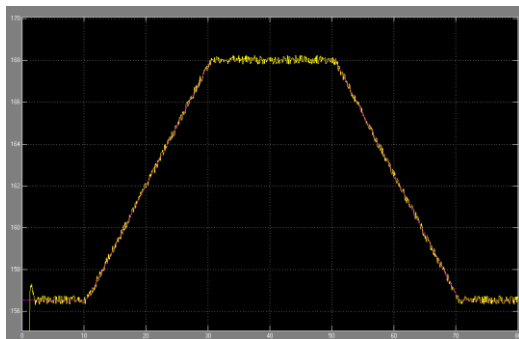


Fig 17b



4. CONCLUSION

The paper analyses the characteristics of the PV power system and proposed a new MPPT control algorithm by combining with various control algorithms. The voltage and current can be ascertained by the open-circuit voltage, impedance web testing, therefore the unsettling influence of PV

framework with conventional discovery technique. Keeping in mind the end goal to decrease the force wavering around MPP and the "false judgment" marvel, variable step P&O strategy is received by steady estimation technique to inquiry step, so the MPP can be quickly and precisely followed. Through the trial and recreation, it exhibits that the enhanced calculation can rapidly track the change of outside environment as per the bends of two calculations furthermore evade the force vacillation. The results also confirm that the proposed can reach MPP which is faster than traditional P&O method about 0.2s and can be better tracked to the real maximum power curve which the average of the tracking error is 0.53%. It reveals that the designed control method has a adequate performance and good practical value.

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