Solar Power Generation System Using Seven Level Inverter

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***Abstract*— Non conventional energy source is a need of today's world. This paper presents proposed method of solar power generation system. To take this system up to next level in proposed system seven level inverter is added. The combined advantage of solar power generation system with seven level inverter systems has edge over other power generation system in terms of several quality parameters. The proposed system has been implemented using system modelling. For system modelling Matlab Simulink is used. Seven level inverter with all added advantages of multilevel inverter like Low electromagnetic interference, low disturbances, and working at low switching frequency makes this system outstanding with respect to other power generation systems. Solar power generation system is equipped with MPPT Controller to track maximum power for solar panel system. MPPT ensures maximum power at changing environment. In MPPT Controller Incremental conductance algorithm is implemented to ensure maximum peak power tracking.**

***Index Terms*— Seven Level Inverter, MPPT Controller, Incremental Conductance algorithm, Simulink.**

I. INTRODUCTION

With increasing need of energy sources the utilization of conventional energy sources has reached its peak point. As compared to past decade requirement of energy sources has been increased three times. Though energy requirement is increased although conventional energy sources hasn't changed. Even it can be said that conventional energy sources has decreased their capabilities to fulfill need of energy sources. To overcome this situation non-conventional energy sources came in to the picture as an alternative to conventional energy sources or option to Conventional energy sources. In Non-conventional Energy sources Wind power generation system and solar power generation systems are mainly included. These non-conventional systems have advantages over conventional energy sources in terms of capabilities to generate Energy as well as these sources will never ever came to an end. Increased pollution with increased industrialization and population is one more concern of today's era. With increase in pollution global warming is increasing which is ultimately threat to all human kind. To stop or lower pollution it has become necessary to utilize more and more Non-conventional energy. Because it is almost pollution free source of energy. Looking at several advantages of Non-conventional energy as well as necessity of it towards the all humankind, it is must to have more research over non-conventional energy sources to increase its capabilities and utilization. In proposed system Solr power Generation system is focused to increase its capabilities.

Main concern about solar power generation system is that according to change in environment their capabilities to generate energy get hammered due to change in light condition. To overcome this problem Maximum power point tracking controller is introduced. This controller ensures maximum power tracking for solar power system to generate more energy with changing environmental condition. Maximum power point tracking controller is loaded with Incremental conductance algorithm to enable controller to make its function with accuracy and fine quality. After solar power generation system the next phase is to covert DC power to AC power for which Inverters are necessary. Here instead of two level inverters, the multilevel inverters are proposed due to their several advantages like Low electromagnetic interference, low disturbances, and working at low switching frequency. In multilevel inverters, seven level inverter is proposed. All these systems together form a quality and effective power generation system.

II. LITERATURE REVIEW

A. Maximum power point tracking

Maximum power point tracking is utilized to ensure maximum power generation by solar power system with change in environment. This system has been found more effective and efficient to overcome issues related solar power generation system. The said system mainly has two algorithms. P & O i.e. perturbation and observation algorithm. & Incremental conductance algorithm. In P&O algorithm it works on approximation principle. It approximates or adjust the voltage and check whether power is increasing. If at same direction of voltage change power is increasing, the approximation of voltage is done consecutively till the power reaches at its peak level. This method is simple and effective but high level of adjustment in voltage there could be issue of power oscillation. Next algorithm is Incremental conductance algorithm. This method has good speed as compared to P&O algorithm, and less power oscillation issues. This method is based on theory of change in voltage and current at PV cell to analyze maximum power point. According to it incremental changes at voltage and current when equals array of voltage and current, the Solar system achieves maximum power point. The said system has highest success ratio as compared to other algorithms although it is much complicated as compared to P&O Algorithm. In proposed system also incremental conductance algorithm has been proposed.

B. Seven Level Inverter

Though the MLI i.e. multilevel inverters have various features, use of number of switches in the traditional configuration introduce a drawback to its wide level of application. Hence, a redesigned Seven level inverters in multilevel inverter technique is developed utilizing the less number of one directional switches as well as gate trigger circuits, This technique ensures a less switching losses happening in multilevel inverters. Not only switching losses nut also it reduces size and implementation cost of an inverter. The re developed technique at multi-level inverters is more compatible and convenient for Non-conventional energy sources and electrical drives. In proposed system also seven levels Inverter is proposed.

III. SYSTEM DEVELOPMENT

A. Block Diagram

The proposed system has following components:

1. Solar Panel
2. DC-DC Converter
3. MPPT Controller
4. Seven level Inverter
5. AC load

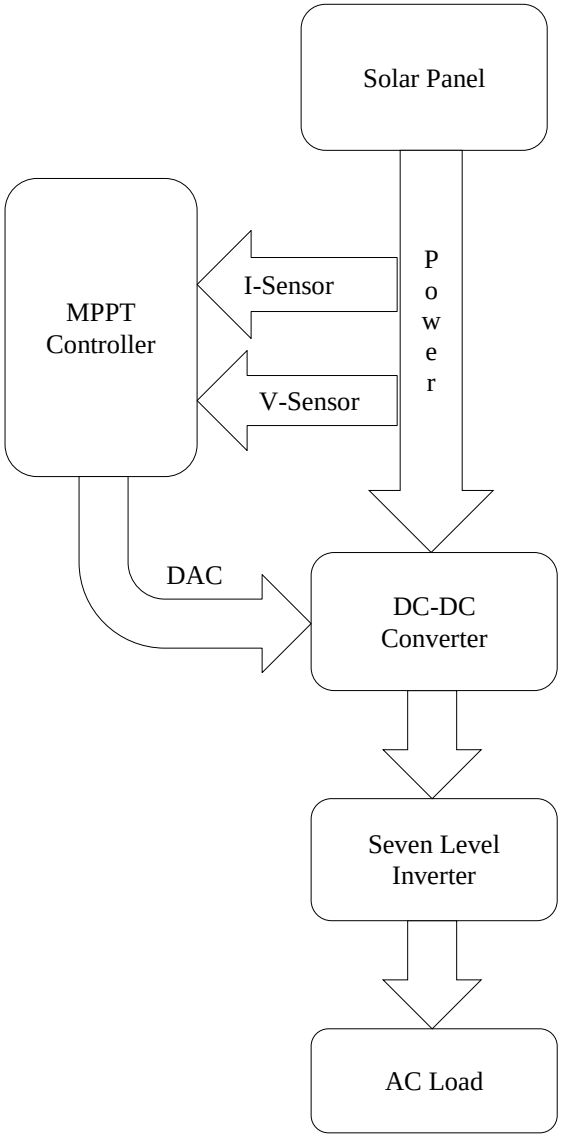

Figure. 1

As shown in proposed system block diagram Solar panel is used as input source. The Dc power from input source is given to DC-DC converter. This converter boost input to specific level as well as MPPT controller maintains output power of DC-DC converter at maximum power point tracking using Incremental conductance algorithm. MPPT controller has feedback from voltage and current sensor. These feedbacks are utilized by incremental conductance algorithm as an input. According to output of incremental conductance algorithm, The MPPT controller sends feedback to update DC-DC converter for maximum output. Output of Converter can be given to battery or directly to seven level inverter. Seven level inverter provides EMI free and stable AC output. This AC output can be utilized by AC load according to Application.

B. ALGORITHM

1. Start
2. Check input from Solar Panel.
3. Feed Dc power to DC-DC converter.
4. Send current and voltage feedback to MPPT Converter.
5. Boost DC Power with MPPT Controller feedback Using Dc-DC converter.
6. Convert DC power to AC power using seven levels Inverter.
7. Apply power to AC load.
8. Go to step 2.
9. End.

IV. CONCLUSION

The proposed system in bouquet of different systems together to provide effective and efficient power generation system. The Non-conventional energy source that is solar power generation system with Maximum power point tracking algorithm provides maximum power. This power is green power. It is pollution free power ensuring long life power. Ensuring long life of conventional energy sources. While use of seven level inverter ensured Electromagnetic interference free power as well as low disturbance power for AC load. With all these advantages proposed system will be outstanding power generation system fulfilling today's world need.

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