Solar based Multi-Level Inverter with Enhanced PWM for 9 Level Inverters

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Abstract **-** In this paper we study Solar based Multi-Level Inverter with Enhanced PWM for 9 level inverters. A solar inverter is one of the most important elements of the solar electric power system. The aim of this paper is to developing 9 level inverter and these is having more power output. Here we are using the technique enhanced PWM. Here we are converting the 5 level to 9 level. The term solar smart inverter has become a buzzword in the electronics industry which is a blending of multilevel inverter, solar tracking and solar charging. Inverters are predominantly classified as single level inverters and multilevel inverters. Multilevel inverters can operate on various voltage levels. Multipurpose applications, such as active power filters, machine drives for sinusoidal and trapezoidal current applications can be realized by multi-stage inverter. By incorporating pulse-width modulation (PWM) control, within the inverters we can control the gain of inverters more effectively.

I. INTRODUCTION

The problem of greenhouse effect is due to the extensive use of the fossil fuels. Cost of fossil fuel energy is rising and increase in air pollution paves a way to the study of solar energy. In this scenario, this paper emphasis on Solar Smart Inverter (SSI) which is a blending of solar tracking, charging and multilevel inverter. In the next years the power inverter will change more than has in the past few years. The recent technology concentrates on the improvement of smart inverters. Energy economics and utility system integration are the main technical challenges addressed by the smart inverters. Energy economics highlights improving inverter reliability, increase energy harvest and improve solar power forecasting. Multilevel Inverter topologies include the diode clamped, the flying-capacitor and the cascade H-bridge types. Here we are using cascade H-bridge topology where switching control is done with the help of pulse width modulation (PWM).

Multilevel inverter is normally having three types cascade H-bride, diode clamped and flying capacitor. The diode clamped and flying capacitor and cascade H-bridge inverters are always used a capacitor to build up the several voltage steps. However, it is hard to control the voltage of these capacitors. Since it is hard to generate voltage knowledge in both the diode-clamped and the flying-capacitor topologies, the power circuit is difficult by the increase in the voltage levels that is essential for a multilevel inverter. For a seven-level inverter used a 12 MOSFET switches in both diodes clamped and flying capacitor network topologies also the cascade h-bridge MLI is to permit many stages of output voltage, so that cascade h-bridge inverter is always suitable for many applications among improved voltage stages. So that in circuit topology two h-bridge inverter among dc bus voltage of multiple connection and is connected in cascade fashion to produce a single phase seven stage inverter and also used an 8 MOSFET switches. However, in recent years, different types of topologies are seven stage inverters. For example, a single phase seven level grid connected inverter has been developed for solar power generation system.

II. LITERATURE REVIEW

The topology with the given PWM technique reduces the high-frequency voltage transitions in the terminal and common-mode voltages. Avoiding high-frequency voltage transitions achieves the minimization of the leakage current and reduction in the size of EMI filters. Furthermore, the extension of the CMLI along with the PWM technique for 2m+1 level is also presented, where m represents the number of Photo Voltaic (PV) sources [1]. Standalone PV Systems are very useful in providing Power to the remote located electrical loads, but the stand-alone system cannot supply power during all atmospheric conditions. [2]. The total power generation from the photovoltaic (PV) system is relatively small as compared to other common energy resources due to its high installation cost [3]. One type of renewable energy source is the photovoltaic (PV) cell, which converts sunlight to electrical current, without any form for mechanical or thermal interlink. PV cells are usually connected together to make PV modules, consisting of 72 PV cells [4]. A multilevel inverter is a power electronic device which is capable of providing desired alternating voltage level at the output using multiple lower level DC voltages as an input [5]. solar energy is one of the favorable renewable energy resources, and the multilevel inverter has been proven to be one of the important enabling technologies in photovoltaic (PV) utilization. Multilevel voltage-source inverters offer several advantages compared with their conventional counterparts [6]. Transformer less multilevel inverter (MLI) topologies are highly efficient, and have low switch count, low weight, and reduced size. Removal of the transformer eliminates the galvanic isolation between the photovoltaic (PV) array and the output load. Removal of galvanic isolation increases the leakage current safety is reduced in Photovoltaic systems [8]. pulse width Modulation (PWM) procedure diminishes the high

frequency voltage advances in terminal and regular mode voltages [9]. The developments in power electronics and semiconductor technology have triggered the improvements in power electronic systems. So, different circuit configurations, namely multilevel inverters have become popular and considerable interested by researcher are given to them [10].

III. IMPLEMENTATION

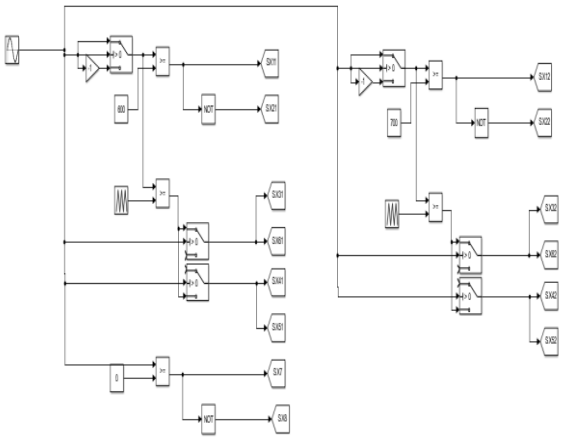

Figure 1: Proposed Control system for enhanced PWM

The above figure shows the Proposed Control system for enhanced PWM, the PWM (Pulse Width Modulation) is technique here we get analog output with digital means.it is used to vary the width of the pulses in a pulse-train. Here the input is a carrier wave and a sin waves and the out is analog output with digital means. The pwm signal is controlling the signals.

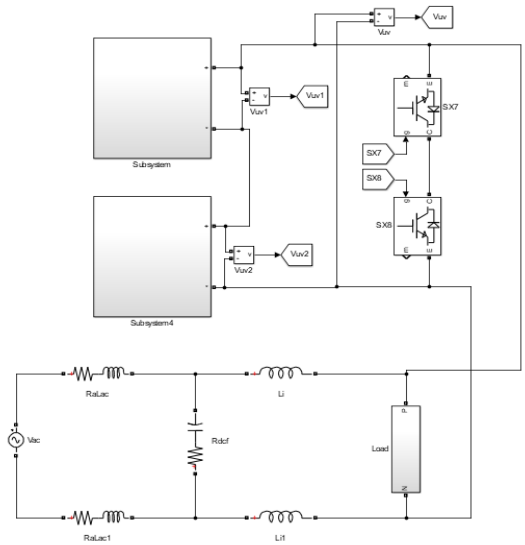

Figure 2: Proposed model for 9 level output generation

The figure 2 is Proposed model for 9 level output generation, this is our proposed system here converting the 5-level input to 9 level output using enhanced PWM technique. This circuit is used to generating 9 level output.

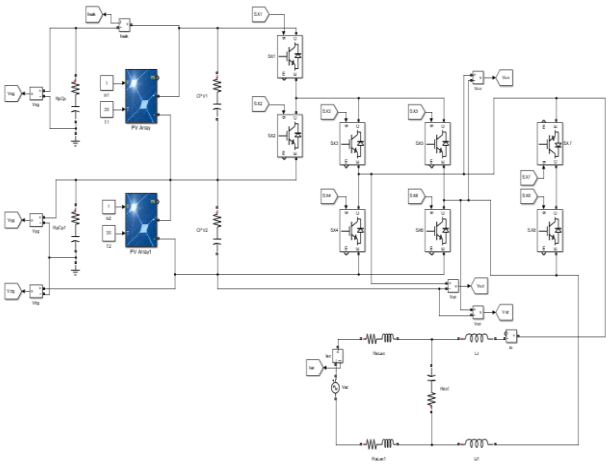

Figure 3: Model for existing 5 level generation

The figure 3 shows the Model for existing 5 level generation, this is used to generating 5 level output. The circuit is used to translate signals from one logic level or voltage domain to another,

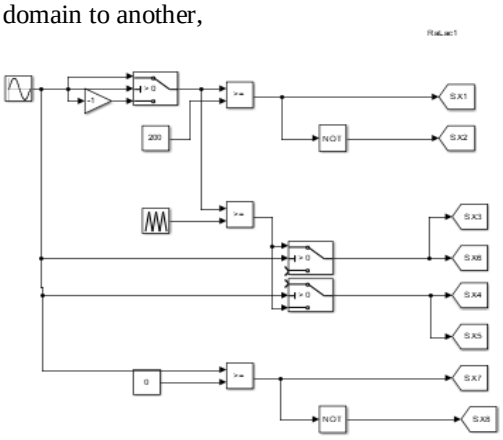

Figure 4: Control for gate pulses for three level generation

The above figure 4 shows the Control for gate pulses for three level generation, this circuit is used to generating the 3-level generation.

IV. RESULTS

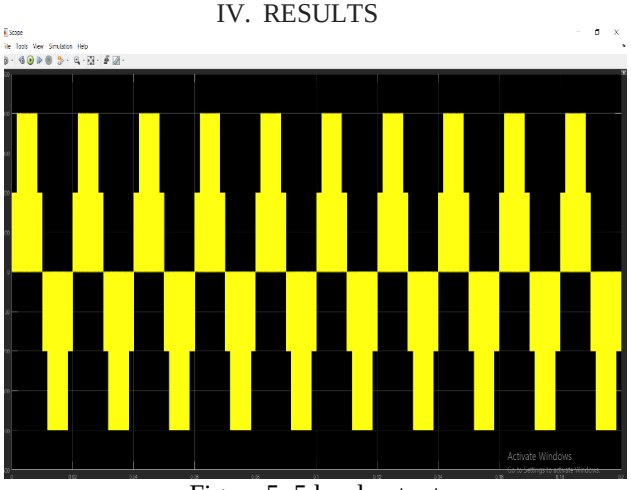

Figure 5: 5 level output

The waveform shows the 5-level output, this is having 5 level, this is our input of the proposed system.

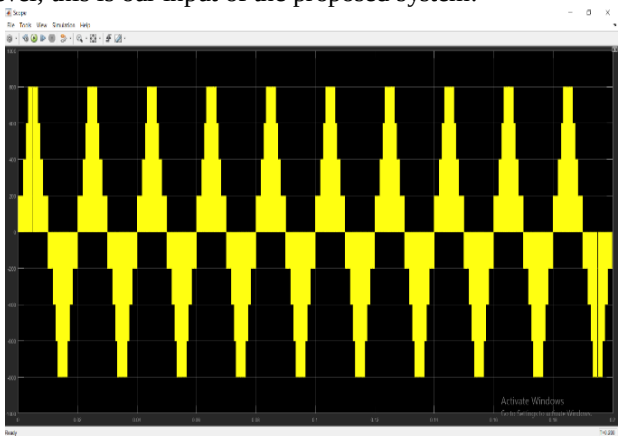

Figure 6: 9 level output

The figure 9 shows the 9-level output, this is out of proposed system this is having 9 levels, this is giving more accurate analog signals and it is more accurate than 5 level output.

V. CONCLUSION

Hence, we studied in this paper Solar Based Multi-Level Inverter with Enhanced PWM for 9 Level Inverters. Here the output is 9 level output, this out is used to controlling the signal and we are using the technique enhance PWM, here we are the out is analog signal in digital mean. The main objective of this paper is to produce sinusoidal wave form with minimum distortion from separate DC source by using multilevel inverter is validated. However, the focus on multilevel inverter here is not meant to downplay the importance of solar tracking and charging system. Solar Smart Inverter has a great significant to energy savings and utility system integration.

VI. REFERENCES

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