PERFORMANCE ANALYSIS OF NINE LEVEL INVERTER WITH R AND RL LOAD

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Abstract

This paper shows an Analysis of 9 level multilevel inverter with R and RL stack. The customary framework utilizes 16 changes to create 13 level yield, yet its limited in the proposed framework. The proposed frame work investigated and contrasted and Inductive and engine stack. The recreation comes about are contrasted and two distinctive load. This proposed system can be utilized as a part of inverter applications.

1 Introduction

This project presents execution comes about because of one of the principal framework associated photovoltaic (PV) frameworks in
The 45 kW framework is mounted over a level rooftop at the home office of a nearby service organization, in [1]. Execution of staircase balance diminishes the aggregate consonant bending to the minimum conceivable and a LC channel side of the inverter additionally decreases done by definitely at the AC side. The investigation has been accomplished for both lamp and motor loads is mentioned in [2].

The inverter operation is executed utilizing an AT89S52 Microcontroller are represent by direct circuit is mentioned in [3]. The blend of two number of three-level inverter called as Mass inverter. This uses 33 percentage of intersection point voltage...the shaping inverter is inspired by partnered capacitors, and the course chose by capacitor undeviating as said in [4].

To pull in much enthusiasm because of their expanded cost related with the extra segments and convoluted control. d. By consolidating the three-level NPC PWM consecutive utilizing DC sources and appropriately stage moving the regulating wave and bearer a streamlined control methodology is accomplished with lessened number of components is discussed in [5]. The little scale industry utilizes late Multilevel inverter by two uses a PWHM framework which has twelve states for various periods. the consonant distortion is around 15 percentage as explained in [6].

The inductor cells are associated in parallel to the information circuit for current source inverter to obtain yield current, utilizing diverse source additionally talked about in [7].

Determination of space-vectors was utilized to guarantee that both the DC sources dependably convey genuine energy to the heap, kill the likelihood of cheating of the littler DC transport. Exchanging state choice was utilized to keep the gliding capacitors all around adjusted independent of the exchanging recurrence, regulation record or load current while likewise disposing of dead-time drifters. These elements were shown in consistent state and transient operation utilizing a research facility model discussed in [8].
2 SINUSOIDAL PULSE WIDTH MODULATION

The sinusoidal pulse width modulation as shown in the figure 1. It consists of two signals: one is the reference signal and the other one is the carrier signal. By comparing these two signals, the PWM output voltage can be obtained as shown in the figure 1. Here, the reference signal is a sine wave, and the carrier signal is a triangular wave as mentioned. The figure represents the time period vs amplitude of the signal. The sinusoidal pulse width modulation is used in the 9 level multilevel inverter.

Fig. 1. Sinusoidal pulse Width Modulation

The resonance of the inverter can be lessened by Sin PWM Technique. Heartbeat width is tweaked with a specific goal to get controlled yield voltage and lessened reverberation. SPWM is the most commonly used method for motor control and inverter applications. To generate the SPWM signal, conventionally, carrier triangle wave is compared with the sine wave of operating frequency is expressed in [9]. The trading repeat system acting requires each of the changing traps to be turned on and off just on super cycle of the real repeat and logical thing and realizes making the staircase sort of waveform. Pulse thickness Intonation: In mechanical applications, the transporter based SPWM framework is completely
utilized, which utilizes organize moving limit and calling emanation technique to lessen the symphonic in the warhead potential separations, Pulse Width Modulation (PWM) procedure is productive to get the required present or electric potential to campaign the heap. The PWM strategy is progressively utilized for AC drives in perspective of the diminished symphonic current and the level best yield voltage to drive the store. The essential attempt in all PWM method acting is to pass on the required plentifulness and rehash of the fundamental while lessen the estimation was analyzed in [20].

3 DIFFERENT SCHEMES OF MULTILEVEL INVERTER

3.1 EXISTING SYSTEM

The fell multilevel inverter the Four H Bridges are connected in back to back connected in series with separate source as structure as appeared in the figure .2. A cascaded multilevel inverter uses 16 switches to produce 13 level waveform. The switching pulse for the inverter are sine PWM technique.

The multilevel inverter output is more than the number of inputs of the inverter. The output voltages are 4V, 3V, 2V, V, 0, -V, -2V, -3V, -4V are obtained

Number of level obtained —-(2) Cascade is termed as symmetrical cascade, an individual Full bridge voltage source inverter has 4 switches. So more number of voltage source required and switches required and subsequently add up to cost of the circuit increments and which brings about Increased Total Harmonic Distortion and Switching misfortunes is discussed in [11]
4 RESULTS AND DISCUSSION

4.1 Simulation of pulse pattern of Nine level inverter

The figure 3. Shows the yield of the Sine PWM Technique of the proposed inverter for various eras regarding the exchanging Table 7. The wrongdoing PWM system can be acquired from looking at reference and transporter flag which demonstrates the steady voltage got from the sunlight based board at all periods.
4.2 Simulation of nine level inverter with RL load

The reenactment of Solar based Nine level inverter Shown in figure 4. The projected Nine stage inverter is mimicked utilizing R L stack.

The Nine level multilevel inverter With R L stack as appeared in figure 6. The above wave frame comprises of day and age in X pivot and ventured yield voltage of the inverter in Y hub.
4.3 Simulation of Nine Level Inverter with RLE Load

Fig. 5. Simulation of PV based Nine Level Inverter with RLE load.

The simulation of PV based boost integrated 9 level inverter with R L E load using MATLAB as shown in the figure.5. The output to be measured through scope as indicated in the different colours.

4.4 Simulation of Nine level inverter with R L-load

Fig. 6. The Output voltage of the Nine level Inverter For R-L Load
Fig. 6. The Output voltage of the Nine level Inverter For R-L-E Load

4.5 Simulation Output Voltage of Nine level inverter with R LE- load

Fig. 7. The Output voltage of the Nine level Inverter For R-L-E Load

The Output voltage of the Nine level multilevel inverter With R LE stack as appeared in figure 7. The above wave frame comprises of era in X pivot and ventured yield voltage of the inverter in Y hub.

4.6 Simulation Wave form of rotor speed and Electromagnetic Torque of Induction motor

Fig. 8. The Output voltage of the Nine level Inverter For ROTOR SPEED and Electromagnetic torque

The figure 8.shows the Rotor speed and Electromagnetic torque of the proposed s sort PV based multi level inverter .from that diagram, watched that amid the beginning time of the engine the speed changes from O to 1450 RPM and after some moment there is little decline in speed and again keep up the steady speed 1400 RPM comparing torque likewise kept up at consistent .5 N-m
The Total Harmonic Distortion of the proposed inverter RL stack broke down from FFT investigation as shown in the figure 9. The above investigation demonstrates the size Versus Harmonic request shape that we watched that THD is 4.20 percentage which is not exactly the IEEE standard.

4.7 THD of proposed Multilevel inverter with RLE load

The Total consonant Distortion of the proposed inverter RLE stack dissected from FFT examination as shown in the figure 10. The above examination demonstrates the extent Versus Harmonic request frame that we watched that THD is 28.05 percentage.

Table 1 Comparison and analysis results of different 9 level inverter

<table>
<thead>
<tr>
<th>S.No</th>
<th>Components</th>
<th>Existing System</th>
<th>Proposed System</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Switches</td>
<td>16</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>Voltage</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>THD</td>
<td>18.02</td>
<td>RL-4.28, RLE-28.05</td>
</tr>
</tbody>
</table>

The analysis and comparison of different parameter as shown in the table. 2. from the above results the THD of the proposed inverter has 0.21 and switches are reduced from 16 to 7 and the voltage sources reduced from 4 to 1.
4.8 CONCLUSION

The analysis of 9 level inverter with RL and RLE Load are reenacted and looked at and the THD of the inverter is 4.20 while compared to the RLE load.

References


