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A NOVEL SWITCHED CAPACITOR DC-DC BOOST CONVERTER TO BALANCE THE DC LINK VOLTAGEFOR NPC MULTILEVEL INVERTER

B. Suresh Scholar student, Dept of EEE, Sathyabama institute of science and technology, Chennai, India.
V. Sivachidambaranathan Professor, Dept of EEE, Sathyabama institute of science and technology, Chennai, India.

Abstract:

The new step-up capacitor network is attached to the solar-energy which convents light energy to electrical. A photovoltaic (PV) system having the balancing voltage converters. It's appropriate for neutral point clamped (NPC) Multilevel Inverters (MI). To maintain the capacitor DC link voltage effectively we've got to use switched capacitors. By using balancing converter, we will enlarge the high-rise levels and also by boosting input voltage we are able to see the upper levels of voltage without using magnetic components. This attribute allows working the output and input voltage by self-balancing. The balancing DC link voltage for NPC multilevel inverter based solar PV Grid is operated by using vector scheme control. The system of PV incorporates a power point Tracking (PPT) and it's executed in Matlab power system. The simulation result topology can successfully balance the DC voltage and excess power from grid. The insert power inside the grid can vary the solar light with active performances.

1. INTRODUCTION

Multidimensional power supply is used for grid connected system, because it has more advantages that are there is no generation of harmonics. We can minimize harmonics by using unit power factor. Multilevel inverters are mainly suitable for medium and high-power voltages. There is some disadvantage for multilevel inverters. So to minimize those drawbacks we are using neutral point clamped. NPC -MLI are used for electric generator drives and grid integration, solar PV system.

A solar PV system is a renewable energy source, so mostly we are using those types of systems because it doesn't exhaust and also it is a natural and renewable resource. Wind energy, tidal energy are also a renewable resources but we mostly use solar because its cost is very cheap compared to wind and tidal energies.

Grid is a network of connecting parallel lines whether it is real or imaginary. Grid PV System is electricity generating solar power system. When the sun shines on to solar panel, the energy from sunlight is absorbed by the PV cells in the panel. Solar energy converts heat energy into electric energy. Residential solar panels generate power 250 to 400 watts energy..

2. SYSTEM STRUCTURE

The voltage stabilizing converter has a PV array, boosted converters for balancing a capacitors voltage, three phase NPC Multidimensional power supply, inductor and capacitor

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filters is used to boost the cumulative distortion and changing the stair case voltage by decreasing of total harmonics and power network.

Here, all the PV inputs are given to increase a voltage equilibrium converter. The signal voltage is thrice higher the input of PV voltage. These are given to the input to NPC MLI. By using vector scheme we can control the power supply. To increment a conductance, maximize energy extraction is used. The output of trackers is providing the DC link voltage. The output of DC link voltage is provides the power reference, the reference like phantom power and network voltage. The circulating of active or phantom power in grid is managed by the d and q axis currents.

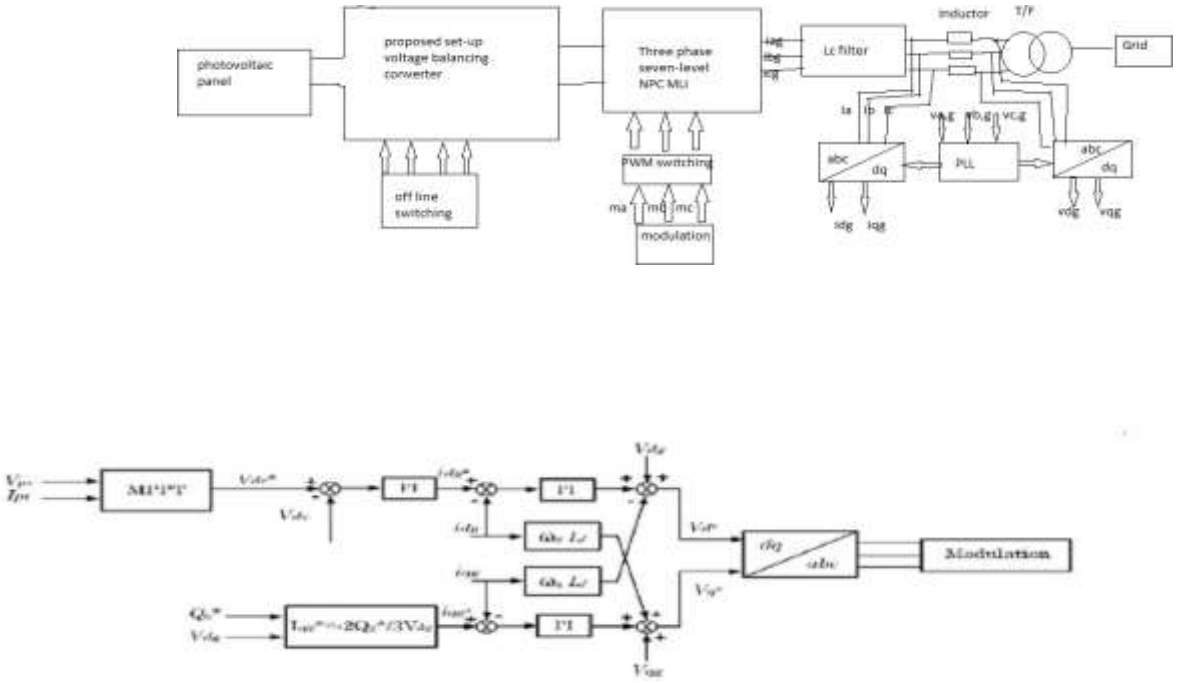

Figure1: The grid attached PV network for boost voltage leveling converter and seven level NPC-ML

3. A STEP-UP STABILIZING CONVERTER:

A converter is made up of two diodes and five energy switches. The insert of constant voltage and current is connected parallel to capacitor. By discharging the capacitors high load efficiency is occurs. It is necessary for selecting the changing states as all capacitor equal to the DC voltage. These converters are connected to a four-level NPC. By connecting three-phase NPC a seven level can be attained.

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In the time of exacting state the amount of capacitors in side by side with input DC voltage or current and cause a voltage difference. In this green color shows the charging path and blue shade denotes discharging route, and red color denotes imposing and releasing at same time. Here the every capacitor is good to charge single time more over the capacitors. It depends on balancing conditions of capacitors.

Terminal's voltage vab=+2vdc.

The capacitor is placed in the middle of the potential difference converter and three-phase NPC Inverter which produces the multilevel output by using simple control strategy.

Here, we use conventional DC-DC converter to convert variable DC-DC converter to fixed DC converter. We use the magnify DC-DC converter that comprises a DC source. This converter needs large number of elements. In a converter the power loss is occurred due changing and diffusion losses. By calculating these losses we can balance the converter.

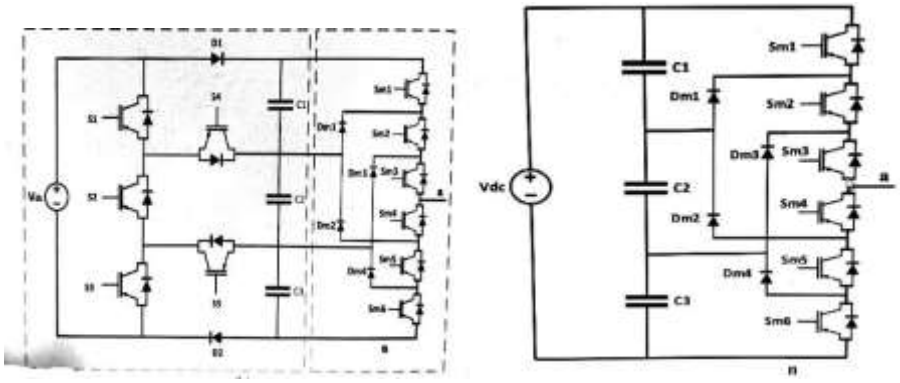

Figure2: Normal four level inactive grip converters and balancing converters are attached to four levels NPC

4. LAYOUT AND CONTROL OF MESH SIDE INVERTER:

A mesh side inverter maintains DC-Link voltage constant. It is worn to equal the voltage of the capacitor. Grid Side Converter (GSC) controls the reactive power at the specific desired value. To control the grid side inverter, we have to maintain unity power factor. Thus, it can build the maximum active power output.

In modulation technique Carrier Based (CB) pulse modulation is used attain voltage output with seven levels using frequency switching. This method is very easy and simple to enlarge less estimated work as compared to the Space vector Pulse Width Modulation (SVPWM).

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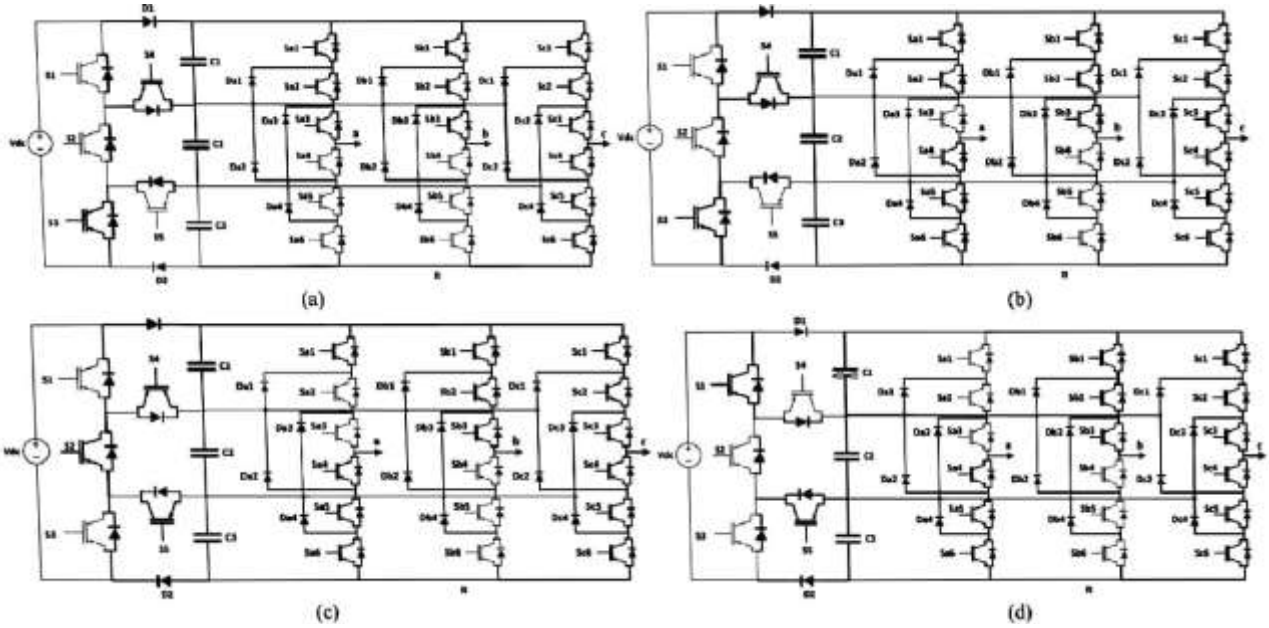

Figure3: (a) Expecting state of c_3 and $v_{ab} = 0$ (b) Expecting state of c_3 and $V_{ab} = 1V_{dc}$ (c) Expecting state of c_2 and $V_{ab} = 2V_{dc}$ (d) charging state of c_1 and $V_{ab} = +3V_{dc}$.

5. Simulation Results:

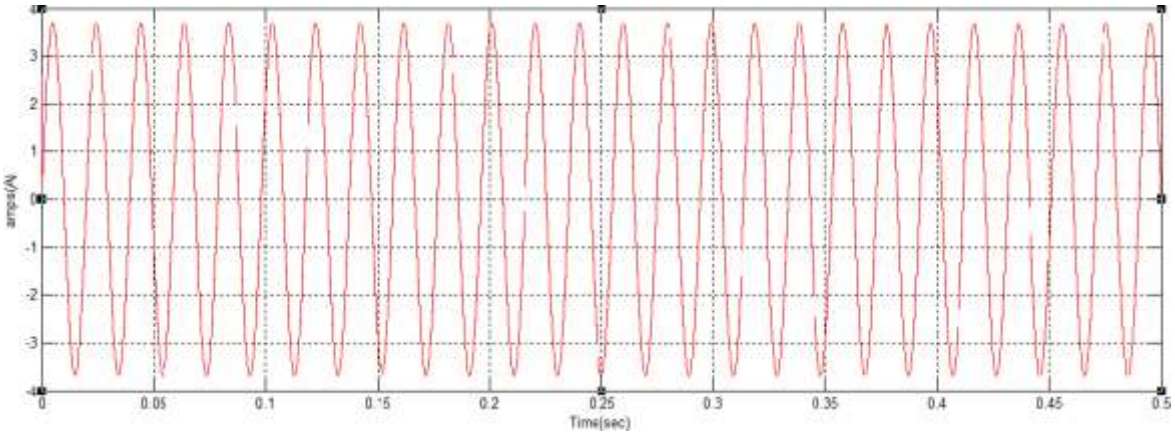

Figure4: Output current of unbiased clamped Multilevel Inverter (MLI).

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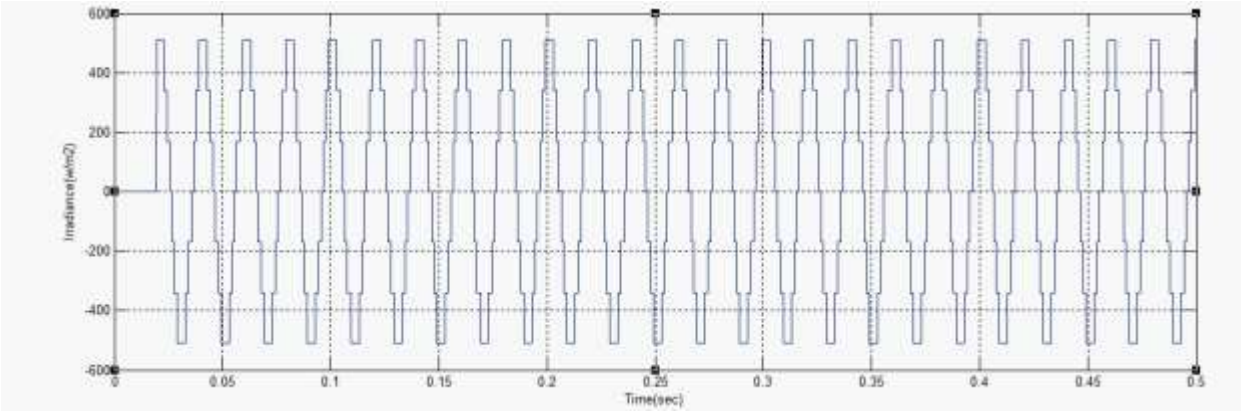

Figure5: Change in Irradiance

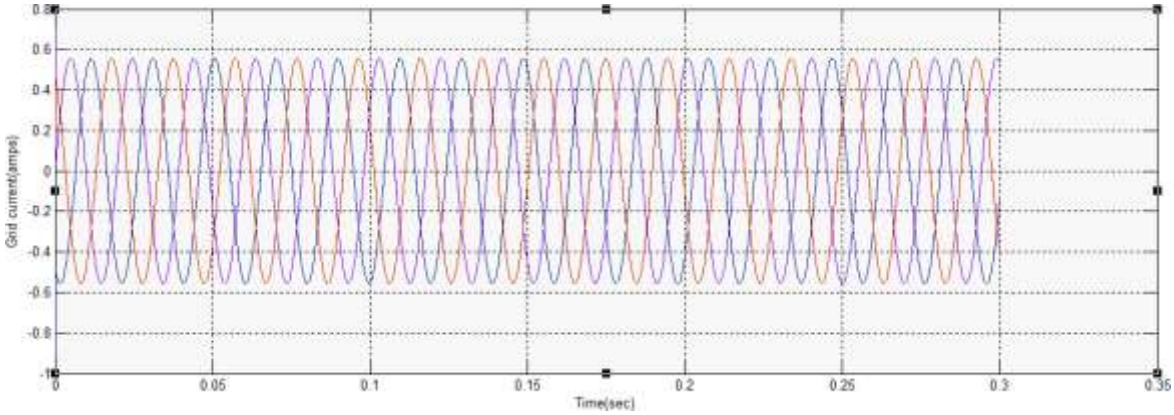

Figure6: Different irradiance on mesh current

6. Conclusion:

An inactive point clip behavior-based inverter is worn to increase the voltage equilibrium converter for solar Photovoltaic (PV) system. These converters are not only used to increase the input voltage to desired output voltage, but it can also eliminate the magnetic elements used in system. By eliminating the magnetic elements the cost and weight of the network is reduces. It requires only one PV formation or DC origin output to generate multilevel product and in order to reduce so many input voltages is required to the system. Normalized energy on report of the output levels, voltage ripple of capacitor and capacitance calculations is also inspects. A heavy difference of other DC to DC topologies has done and it displays the cost value of the convertor. The equilibrium convertor for NPC multilayer inverter based on solar PV network and it is operated by using vector scheme control. This system is applied in matlab power system. The assumed results topology can effectively equalize the DC connected voltage. It can draw out

greatest power from the PV modules. This power is injected into a grid by differing the solar transmittance with acceptable and active presentation.

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