SIMULATION OF DC-DC CONVERTER FOR THE POWER QUALITY ENHANCEMENT

Ms. Preethi D.V[1], Ms. Rashmi R.B[2], Prof. Nandesh K.N[3], Prof. Nandish B.M[4]

[1, 2]U G Students, [3, 4]Assistant Professor
Department of EEE, JIT, Davangere.

***Abstract*: This paper contains a single stage transformer less photovoltaic inverter is presented. It is used for the residential applications. This inverter is taken from a buck converter along to the load and third is the power quality. The inverter is connected to grid the strikes by the utility companies must be implemented. Due to this high quality and efficiency can be achieved. Hence there is only one switch is used in boost converter. They are operating at high frequency and rest of switches of unfolding circuit is operated at fundamental frequency .this paper contains both theoretical analysis and simulation result both are able to produce power quality and with a line frequency unfolding circuits. This system is supply the generated photovoltaic energy to the load grid. Interfacing a solar inverter module with load is used in grid. This performs three major tasks one is efficiency, second is to introduce the sinusoidal quantity efficiency.**

1. INTRODUCTION

Electricity is important part of the human life. It is more important for the growth of the developing nations like India to give the uninterruptable power supply. Electricitys not available naturally. It needs to convert to the other forms of energy sources such as solar, wind, fuel cell and fossil fuels. Indias 88.4% of energy is consumption is coming from the non-renewable sources of grneration.as solar pv based generation has more advantages than disadvantages. Electricity act 2003 has specify the solar power generation in the country. Due to the advantage of solar power generation in India notable in Gujarat has greater strength to generate solar power.

Solar pv cells convert sunlight directly into electricity without pollute the emissions. It is affected by both physical and environmental parameters such as solar radiation and temperature on pv cell. Nowadays pv power supplied to the utility grid is going more and more attention. Hence various standards mentioned by different grid monitoring authorities are has to follows such as issues like power quality detection of islanding operation,dc current injection etc. number of inverter circuit and control schemes can be used for pv power conditioning systems. Depending on the characteristics of pv panels varies accordingly due to different temperature, irradiation conditions, shading and clouding effects. Input voltage of pv inverter can vary widely. so to perform the function of step-up or step-down of voltage. The buck and boost converter can be used instead of bulk device like transformer. So that variation voltage can be prevented and get the reliable output voltage. It can increase the power quality through the matching of grid strikes of the power quality.

2. SOLAR PHOTOVOLTAIC CELL

In a photovoltaic system two or more pv cell are connected in order to produce electricity from the absorption of solar light without any pollutant emission. It consists of many components like pv module, mechanical and electrical connections and mountings. It can regulate and modify the electrical output.

A pv module is more efficient it can operate at optimum operating level. The performance of solar cell depends on several parameters. Operating point of pv modules depends on varying insulation levels. Direction of sun irradiance and also the system load. The amount of power that can be extracted from a pv array depends on the operating voltage of the array[1].

3. BUCK BOOST CONVERTER TOPOLOGIES

Converter is a device which converts fixed dc voltage source in to variable dc voltage source. which is to be used in many industrial applications. Dc convereter consist of continuously variable turns ratio which is to be considered similar to an transformer. Similar to the transformer dc-dc converter can also be used for step up or step down of dc voltage. dc-dc converter can be classified in to 3 types. they are[2],

1) Buck converter

2) Boost converter

3) Buck boost converter.

1. DC-DC BUCK CONVERTER

The average output voltage of converter is always less than the input voltage of the converter is called buck converter. The dc-dc buck converter circuit consists of MOSFET, diode, capacitor and inductor. which act as a step down transformer. here the magnitude

of output voltage will always be less than input voltage of converter. dc-dc buck converter are used in very high range step down converters and low power regulators. Because it has low control difficulty, simple topology and less number of components and no isolation. It is to be used in different solar pv applications. i,e standalone solar pv pumping system for water supply in village areas. Solar battery charges, tracking for grid connected and off-grid pv system[3].

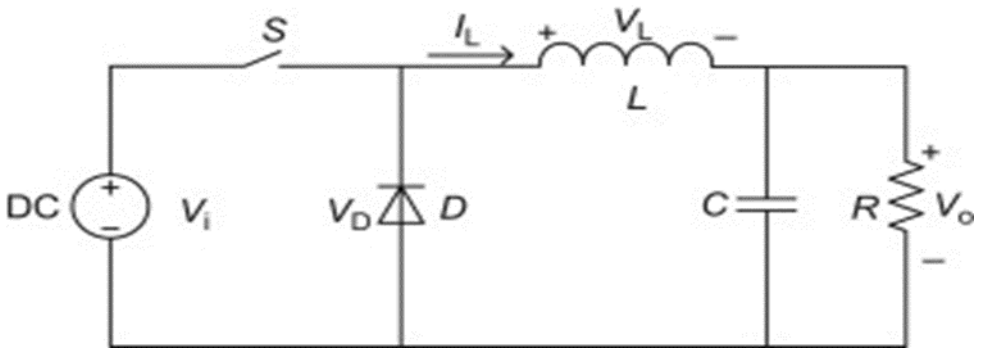

Fig 1.Circuit topology of Buck converter

2. DC-DC BOOST CONVERTER

The converter output voltage is always higher than the input voltage is called boost converter. this circuit includes power switch(MOSFET), diode, inductor ,capacitor, switching controller and load. It is to be used for interface connection between low pv array voltage to high battery bank input. It is working as a step-up transformer. it is to be used for boost the input voltage to the needed value of output voltage. Here the controller will control the switch turn on and turn off purpose. if the switch is turn on the diode will be in reverse biased condition. then the inductor will store the electrical energy. then the capacitor will inject current to the load. If the switch is turn off the stored electrical energy will be shifted to the load. we can use the dc-dc boost converter with pv based power quality management for power factor correction, harmonic elimination, zero voltage regulation and load balancing.[4]

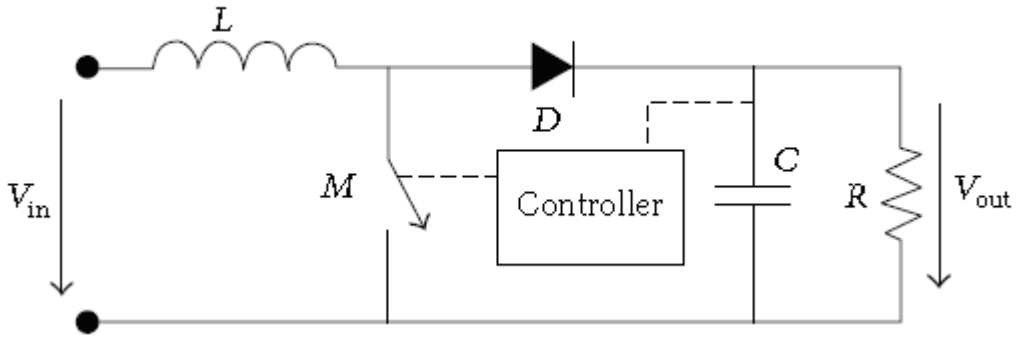

Fig 4. Circuit topology of boost converter

3. DC-DC BUCK-BOOST CONVERTER

The converter which converts the average output voltage. This is greater than or less than the input voltage. This is to be called as buck-boost converter. This is also called as inverting converter because the output voltage of converter has opposite polarity than the input voltage. Which has the output magnitude, either higher or lower than the input voltage to connect with pv array voltage, dc load or battery input voltage. So it is called as bidirectional converter. Buck-boost converter is a combination of two basic dc-dc buck and boost converter. By varying the duty cycle the output of converter can be controlled. If the duty cycle is less than 50% the converter can be operate in buck mode.and the output voltage is lesser than the input voltage. If the duty cycle is higher than 50% the converter can be operate in boost mode. And output voltage is greater than the input voltage. Here the circuit design is depending on the parameters like operating frequency of the inductor, maximum voltage and current that the inductor can withstand and gate drive circuit to generate the PWM switching signal for the power switch triggering[5].

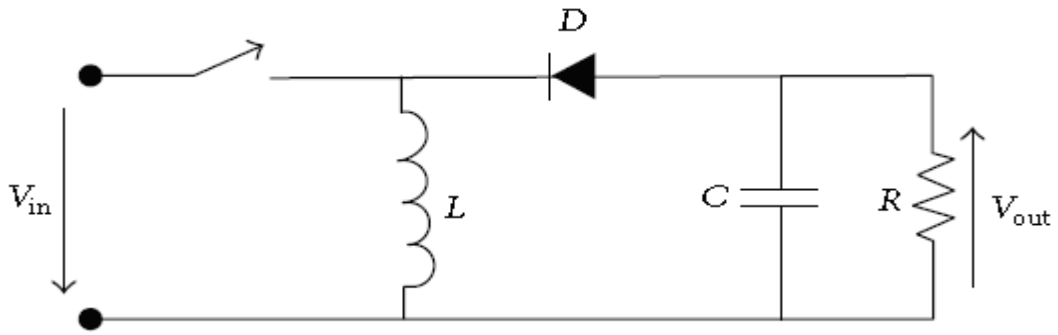

Fig 7.Circuit topology of DC-DC buck-boost converter.

4. CONCLUSION

Here constant dc voltage is found to be improved by the use of the PID controlling technique and MPPT technique.the buck-boost converter is useful for control voltage variations.we can increase the efficiency and power quality of the power from the solar panel by reducing the number of solar panel. And we can step-up or step-down the voltage without using the transformer and we can have the pure dc output with the less cost [6&7].

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