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SWITCH BOOST INVERTER FOR STANDALONE DC NANOGRID APPLICATION

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Abstract: **The switch boost inverter is a single stage power converter which is derived from the inverse Watkins Johnson topology .Here these type of switch boost inverter can able to produce an output voltage that is greater than or less than available dc input voltage This is not happened in voltage source inverter. Also it has a property i.e. better electromagnetic interference noise immune if we compared with voltage source inverter. It also have a property like a compact design of power converter .We have great advantage of sbi is that it can supply both ac and dc power simultaneously from a single unit of dc supply. Because of this it is suitable for dc Nano grid application .In our research paper ,the sbi is use like a power electronic interface in a direct current supply .Now we are going to discussed about the switch boost inverter based Nano grid in detail .In this paper we will also present the dq synchronous references -frame-based it is nothing but the controller used for sbi ,which are regulate the ac and dc bus voltage under steady state as well as dynamic load variation occur in the Nano grid at the given reference**

Keywords: *PV system, PWM, SPWM, THD. SB, switch boost inverter*

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I INTRODUCTION

We have a very old grid system in India. Then we get a low reliability and as well as efficiency. One important thing her is that we use a power grid system for the purpose of generation transmission and distribution. Here this is same as the single path communication. Here it is inter links one to one here it is effect the system, if the any faulty condition is occurs in any system consisting line. The transmission of power is limited. Here we got a very poor information technology in a power system. Here because of absences of very intelligent and co -operative power resources we do not create a flexible electrical power system .then after bad system of power will draw more power loss. After that we cannot penetrate the renewable energy system which is traditional power generation. In this research paper we are going to present swell trend of smart grids. We can define a smart grid as a normal grid which is inter linked with many micro grid .It like a two way communication .So the question is that how it is possible to achieve a desired communication? We can make possible this by connecting mere no of micro grid with system .So it is clear that the we are using more no if generating unit.

II STUDY AREAS

We use for residential power application is dc Nano grid which us low power dc distribution system. For full fill the average load demand done by renewable sources like solar, wind, tidal etc. To maintain the power balance in Nano grid we required an energy storage unit in the Nano grid by doing such thing we can ensure the uninterruptable power supply of the critical load And also maintain the power balance .To avoid reverse power conduction we use a solar panel with the series blocking diode ds .As the different unit of Nano grid is non-uniform And also their dynamic behavior is not uniform we are interfaced to them to the common dc bus by using the power electronic converter. Here each dc load line in Nano grid is have a personnel power electronic interface which is not used for the of simplicity.

Module name

- switch boost inverter
- Nano grid
- synchronous reference frame control

- PV system
- SPWM
- THD
- simulation results
- hardware theory

Module description

Switch boost inverter

We use in a z source inverter l -c network in between the source and voltage source inverter. To achieve the input voltage higher or lower than the input voltage we use its property is stepping up or stepping down by using these property we can achieve the desired level of voltage. By allowing the shot -through in inverter leg switch we can obtain the robust electromagnetic interface (EMI) and also have one other advantage is noise immunity .We made these network by using two inductor and two capacitor, which is responsible for important increase in a size of the power converter existing .For getting the more stable operation the impedance should be perfectly symmetrical which is not easy in practical case. In this research paper we should the alternative of the z source inverter described in next point for better understanding. These arrangement is called the switch boost inverter (SBI).As compared to the zsi the switch boost inverter is use the fifty percent less passive component at the time we take its primary operation .In this paper we are going to explains the steady state small signal of a switch boost inverter .The inverter circuit based on these on inverse Watkins -Johnson topology that we can use for similar in z source zsi.

Nano grid

To connect the generator and to the Nano grid our Nano grid circuit is us the power electronic interface circuit ,and also we use these to link the Nano grid and weak power system .We connect the Pico source interface or the step up converter to connect the Pico source to the Nano grid .We achieve the higher transmission efficiency it is possible by using the Pico source which is produce a low dc voltage .the consumer can draw both type of load i.e. ac and dc from a Nano grid .If we have the control the power flow in the Nano grid it have its decentralized control strategy (tech) by this we can control the power flow drawing from source .We maintain the power balance by independent control of an each single Pico source interface; her interconnection control are not required.

Synchronous reference frame control

We classified the current regulators for ac inverter is are thyrister ,linear poor deadbeat predictive regulator which are used to regulate the sbi It is further sub categorized synchronous d-q frame and stationary abc frame .The synchronous frame regulator is have a better performance as compared to the stationary frame regulator it is the one the great advantage that we are using in the switch boost inverter(sbi) ,because they are operate on a dc quantity and due to this the eliminate the steady state error .In this research we are going to establish the theoretical relation between the two different class of regulator and it further proposes the new type stationary farm and steady state performance consisting synchronous frame pi regulator it is the beneficial relation between the two regulator for better controlling .Thus this type of regulator i.e. the stationary and the p-plus regulator is used for both single phase and three phase.

PV system

We define the photo voltaic as a combination of light and the voltage .It convert the sun light directly into electricity .The power generation by photovoltaic is by using the solar panel which is consist of number of solar cell having photovoltaic material .It is a very sustainable source of energy here more than 100 country are using these .by mean the more than 100 country are used the solar power for generation of energy having great benefits .we have another type of renewable energy is that wind and hydel power which is accepted across all over the world .The pv installation may be on the top of the roof or on a wall .

SPWM

We have a special technique called as spwm technique which is based on the classical spwm technique with the carrier and reference sine waveform .the difference between above modulation technique is, her we used in a spwm digital technique is the value of sine is being sampled at a certain frequency .the we can conclude this as a reference wave form in digital spwm is represent the sample and also it hold sine wave form. As long as the command is bigger than the carrier the output is stays in same condition pwm is define by the supply of energy by using the pulse it deliver the energy to the succession of pulses or in a continuously varying analog signal both can be performed by pwm technique by pwm tech the speed control of motor is achieved .to control the speed of the motor we control the pulse width of the spwm. The inductor of the motor is act like a filter, or released the energy into correspond reference frame or storing energy during on cycle.

THD

Thd is define as the total harmonic distortion it have a complex and confusing concept at the time of understanding .But if we broke it into the basics definition of harmonics and distortion ,it is easy to understand .Now suppose we have two type of the load id linear and nonlinear it is a dividation of total basic load .The power quality of the system is affected by the type of load .The reason behind that is current flow in each type of load .Here the wave form are not distort by linear load .There are so many appliances which are which is draw a linear load .In a nonlinear load the voltage wave form are distorted .

III TECHNIQUE DESCRIPTION

Derivation of sbi from IWJ topology

Iwj convert it circuit into D-TS and (1-D).The interval of switching cycle is called as TS. the time of interval D-TS the both switch of converter in position one .And we connect the inductor l in between input and output .And after that we have another interval on that the position of switch are in 0 position and it is connected between the output and ground as .By interchange the position of (D-TS) and(1 - D).position of interval of cijw converter. This is called as a ciwj topology. Not that this interchange is cant impact on converter state.

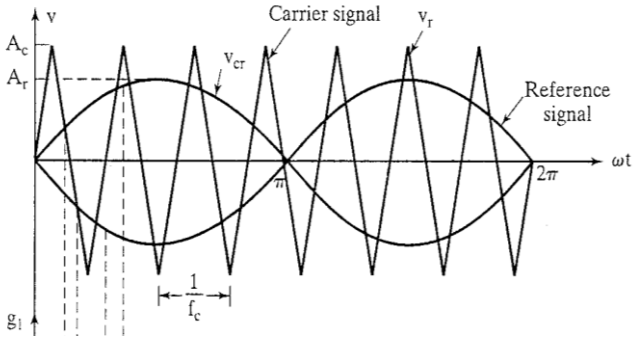

Figure 1 Modulation index

Sinusoidal PWM

If we are consider a multiple -pulse modulation the total pulses are in sane width. We vary the pulse width according to amplitude of sine wave which is evaluated center of the same pule .Here the width of the pole -voltage is pulses is vary sinusoidal manner. The scheme we compare the high frequency triangular carrier voltage and sinusoidal modulating signal by compare this we can achieve the fundamental pole voltage waveform. By maximum magnitude of modulating signal we can limit the magnitude of carrier signal .To control the high side and low side switch of particular pole the comparator output is used. The wave output with the sinusoidal and triangular input voltage .The sinusoidal and triangular signal are fed to the non-inverting input as well as the inverting input terminal one by one. We assume the output of comparator is plus vcc and minus vcc.

Simulation design without modulation

In a following fig we shows the simulation design modulation tech which is implemented in mat lab Simulink we can arranged these by using the plus generator and sinusoidal pwm tech. we can understand this by detailed analysis of following circuit diagram.

Advantage

- SBI is single stage converter
- Small size and reduce cost of system
- SBI can high and low available voltage source
- SBI has better electromagnet interference noise immunity
- Eliminate complex dead time compensation technologies

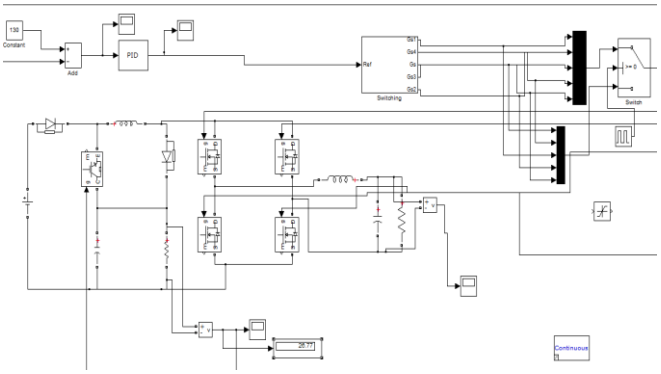

Figure 2 switch boost inverter

IV CONCLUSION

A brief review on switch boost inverter for standalone DC Nano grid application. Nano grid used for connecting generator and load. Nano grid suitable for residential power system applications. Switch boosts inverter a single stage power converter. Switch boost inverter invert power supply.

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