ABSTRACT

A hybrid converter topologies which can supply simultaneously AC as well as DC from a single DC source. The new Hybrid Converter is derived from the single switch controlled Boost converter by replacing the controlled switch with voltage source inverter (VSI). This new hybrid converter has the advantages like reduced number of switches as compared with conventional design having separate converter for supplying AC and DC loads, provide DC and AC outputs with an increased reliability, resulting from the inherent shoot through protection in the inverter stage. For controlling switches PWM control, based upon unipolar Sine-PWM is described.

CONTENTS

INTRODUCTION

Nanogrid architectures are greatly incorporated in the modern power system. In this system there is DC as well as AC loads supplied by different kinds of energy sources using efficient power electronic converters [2]. Fig.1 shows the schematic of the system in which single DC source supplies both AC and DC loads. Fig. 1(a) shows the conventional architecture in which DC and AC load supplied by separate DC-DC converter and DC-AC converter from a single DC source respectively Whereas in Fig. 1(b) referred as hybrid converter in which a single converter stage perform both operations. Such multi-output converters is very well suitable for systems with better power processing density and improved reliability for supplying simultaneous ac as well as dc outputs.. This hybrid converter has the property of higher power processing capability and improved reliability resulting from the inherent shoot through protection.

This paper investigates the use of single boost stage architecture to supply hybrid loads. The conventional VSI in Hybrid converter would through. Also misgating turn-on of switches may take place due to spurious noise resulting in damage of switches. For a compact system, spurious signal generation takes place commonly. So VSI in such application needs to be highly reliable with appropriate measures against shoot- through and EMI induced misgating.

LITERATURE REVIEW

An extensive literature survey is carried out to submit the proposal of this seminar report. There are good number of papers indicate the related research going on in the field.

1. "Study and Implementation of Boost-Derived HybridConverter With Simultaneous DC and AC Outputs"- Prabal.singh

In this paper a work is done on the new topology of converter that can convert DC and AC outputs from a solitary dc input in a single stage. This topology can be achieved by using VSI bridge network in place of controlled single switch if step-up stage architecture to supply hybrid loads.This new hybrid converter topology needed less switches in respect of conventational method. The suggested topology will also improve the reliablity,which is an outcome of its inherent property property of shoot through at the VSI stage.The strategy of controlled PWM is being analyzed and modified in accordance to achieve the beheviour of BDHC topology.

2. "**A Survey On Boost Derived Hybrid Converter For Simultaneous DC And AC Applications"-** R. Kalai Selvi

This Paper introduces new hybrid converter topologies which can supply simultaneously AC as well as DC from a single DC source. The new Hybrid Converter is derived from the single switch controlled Boost converter by replacing the controlled switch with voltage source inverter (VSI). This new hybrid converter has the advantages like reduced number of switches as compared with conventional design having separate converter for supplying AC and DC loads, provide DC and AC outputs with an increased reliability, resulting from the inherent shoot through protection in the inverter stage. For controlling switches PWM control, based upon unipolar Sine-PWM is described.

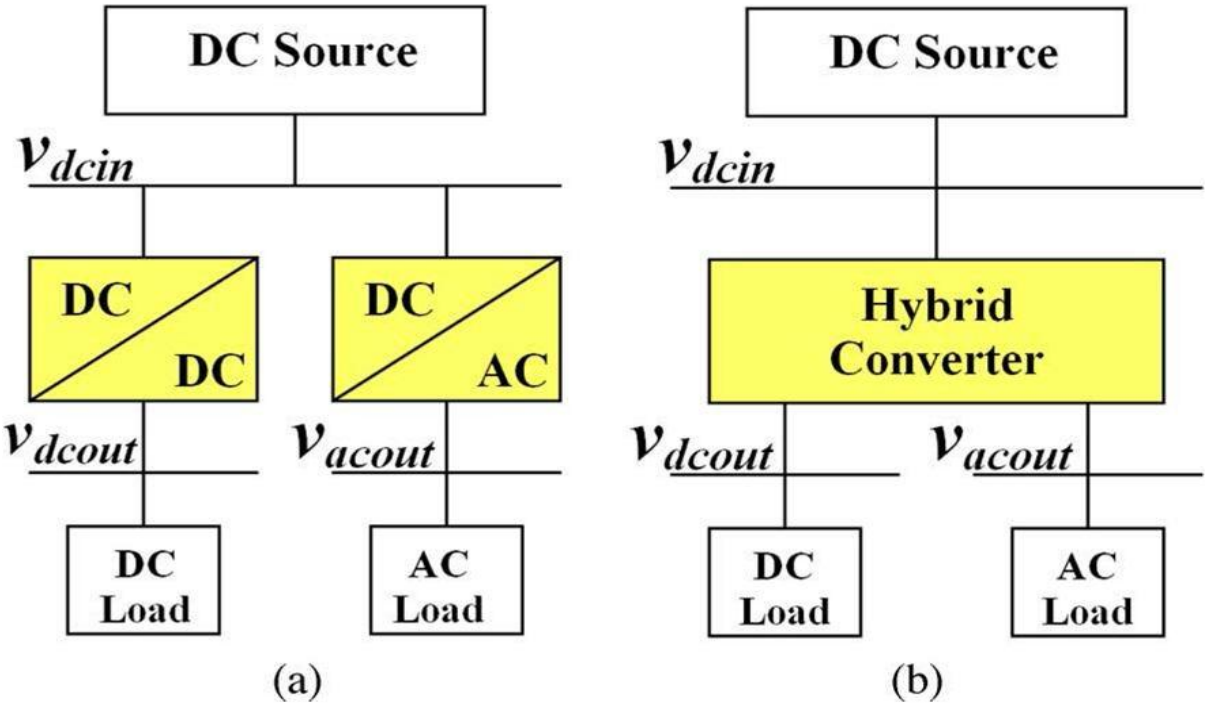
3.“Boost Derived Hybrid Converter For Simultaneous DC And AC Applications”- P.Gowtham

This paper proposes a family of hybrid convertertopologies which can supplysimultaneous dc and ac loads from a single dc input. These topologies are realized by replacing thecontrolled switch of single-switch boost converters with a voltage-source-inverter bridge network.The resulting hybrid con-verters require lesser number of switches to provide dc and ac outputs withan increased reliability, resulting from its inherent shoot-through protection in the inverter stage. Suchmultioutput converters with better power processing density and reliability can be well suited forsystems with simultaneous dc and ac loads, e.g., nanogrids in residential applications. The proposedconverter, studied in this paper, is called boost-derived hybrid converter (BDHC) as it is obtainedfrom the conventional boost topology. The steady-state behavior of the BDHC has been studied in this paper, and it is compared with conventional designs. A suitable pulse width modulation (PWM)control strategy, based upon unipolar sine-PWM, is described.

4. “Boost Derived Hybrid Converter for Domestic Applications”- Prof. Urvashikumari D. Patel

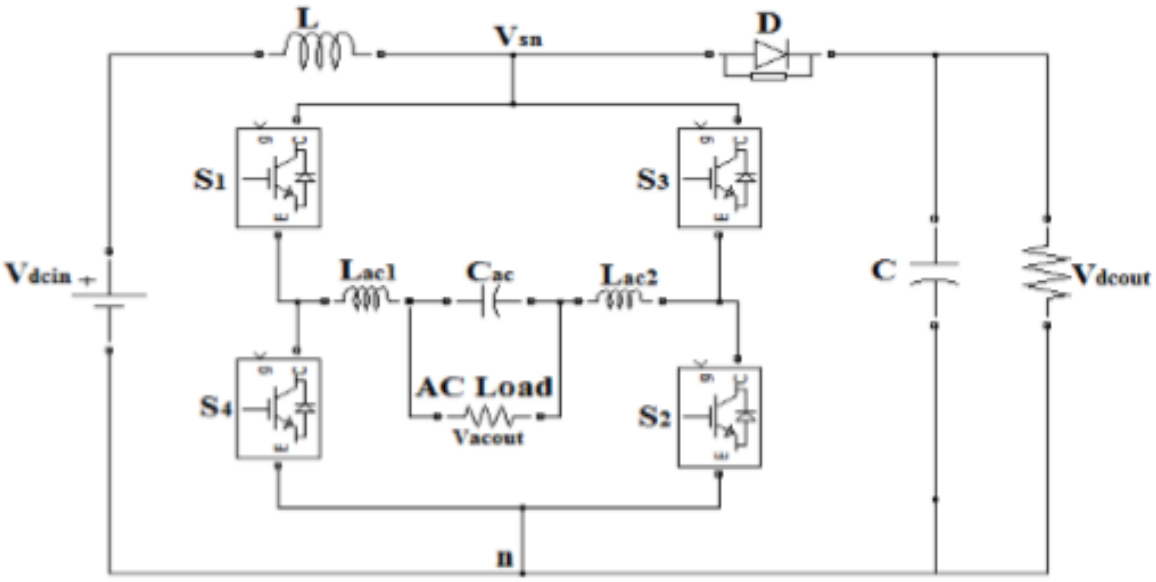
Converters are used in a wide range of applications, from small switching power supplies in computers, to large electric utilityhigh- voltage direct current applications that transport bulk power. Boost derived hybrid converter is use to supply both AC andDC load from the single input. The report of the project is based on the performance of MOSFET based model for boost derivedhybrid converter with Sine-PWM technique. Unipolar Sine -PWM technique is apply for boost derived hybrid converter.Switching logic for generation of pulses on the basis of Sine-PWM is developed and simulated. Simulation of boost derived hybrid converter with resistive load is covered.

BLOCK DIAGRAM



a) Conventional converter b) Hybrid converter-based architecture

CIRCUIT DAIGRAM



Hybrid converter-based architecture

COMPONENTS REQUIRED

1. Dc source

2. Zero source inverter

3.Unipolar SPWM(sine pulse width modulation)

4. Inductor

5.Diode

6.Mosfet

7.Capacitor

8.Ac load

9.Dc load

WORKING PRINICIPLE

In the operation of hybrid converter is concerned this is equivalent to switching on controllable switch of the conventional boost converter. The ac output is controlled using a modified version of the unipolar sine width modulation. The BDHC during inverter operation has the same circuit states as the conventional VSI. The switching scheme should ensure that the power transfer with source occurs only during is positive.

The BDHC has three distinct switching states as described below:

A) INTERVAL 1: SHOOT-THROUGH INTERVAL

B) INTERVAL 2: POWER INTERVAL

C) INTERVAL 3: ZERO INTERVAL

A.INTERVAL 1: SHOOT-THROUGH INTERVAL

Figure shows the equivalent circuit during shoot-through interval. In this interval we adjust the duty cycle for the boost operation by turning on both switches of any particular leg at the same time. Diode D is reverse biased during this interval. Inverter current circulates within the bridge switches.

B. INTERVAL 2: POWER INTERVAL

Figure shows the equivalent circuit during power interval. Here inverter current enters or leaves through switch node terminal S. Switches S1-S2 or S3-S4 turned. Diode is forward biased. Power is delivered to both ac and dc loads.

C. INTERVAL 3: ZERO INTERVAL

Figure showing the equivalent circuit during zero interval. Here diode is in forward biased condition and the power is delivered to dc load. Inverter current circulates within the bridge switches.

COMPARISION

a) Conventional converter	b) Hybrid converter-based architecture
➢ Larger in size.	➢ Smaller in size.
➢ Cost is more.	➢ Less cost.
➢ Less efficiency.	➢ High efficiency.
➢ Non-Reliable in nature.	➢ Reliability in nature.
➢ More Switching loss	➢ Switching losses is less

ADVANTAGES AND APPLICATIONS

Advantages

- Smaller in size
- Less cost
- At simultaneous period both ac and dc can be get
- High efficiency
- Reliability in nature
- Switching loss is less

Application

- Military
- Aerospace
- Nanogrid

CONCLISION

This method proposes new Hybrid converter topologies which can supply simultaneously both DC and AC loads from a single DC supply. The hybrid converter topology discussed in this paper is Boost Derived Hybrid Converter (BDHC) .The proposed hybrid converter has the following advantages, shoot-through condition does not cause any problem on working of the circuit hence improves the reliability of the system, Independent control over AC and DC output and the converter can also be adapted to generate AC outputs at frequencies other than line frequencies by a suitable choice of the reference carrier waveform. Limitations on voltage gain can be achieved by BDHC topology.

REFERENCES

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3. P.Gowtham Assistant Professor Karpaga Vinayaga College of Engineering and Technology, pgowtham185@gmail"Boost-Derived Hybrid Converter With Simultaneous DC and AC outputs".

4. Prof. Urvashikumari D. Patel Prof. Ravi C. BhavsarAssistant Professor Assistant ProfessorDepartment of Electrical Engineering Department of Electrical Engineering U.V. Patel College of Engineering, India "Boost Derived HybridConverter for Domestic Applications".