LITERATURE SURVEY ON HIGH STEP-UP PWM DC TO DC CONVERTER WITH PVA AND RESONANT SWITCHED CAPACITOR

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ABSTRACT

In this paper proposed a new high step up DC to AC converter is introduced controlled with PWM technique. The output three phase AC voltage is fed to three phase induction motor controlled by vector control. The converter is connected to low voltage renewable source like PVA or battery. Low dc voltage sources and energy storage devices, such as photovoltaic (PV) cells, fuel cells, battery, and super capacitor, are usually need to be boosted to a high ac voltage level for industrial applications. The low voltage is stepped up to higher voltage using the proposed converter with coupled inductor and resonant switched capacitor. A high step-up converter and a step-down version integrating buck/boost and SC techniques are presented. The proposed a high step-up converter based on switched-inductor structure. With the combination of SC and switched-inductor techniques, a series of single-stage SC inductor converters is introduced.

Key words: Magnetic Coupled-inductor, dc–dc converter, soft switching, switched-capacitor, PV Array.

I.INTRODUCTION:

VARIOUS low dc voltage sources and energy storage devices, such as photovoltaic (PV) cells, fuel cells, battery, and super capacitor, are usually need to be boosted to a high ac voltage level for industrial applications [1]. One solution is to use step-up multilevel inverters to convert them to a high ac voltage directly [2]. Another mean is to employ high step-up dc–dc converters to first boost them to a high dc level and then to connect with a full bridge. For high step-up dc-dc conversion, transformer-based switched-mode power supplies (SMPSs), such as Fly back and Forward converters, etc., are normally applied due to their simple structure. In recent years, many novel high step-up dc–dc converters have been developed by utilizing one or several of the following techniques: switched-capacitor (SC), also known as voltage-multiplier or charge pump, switched inductor, tapped inductor, and coupled inductor. For instance, high step-up zero-current switching (ZCS) converters implemented by resonant SC technique are presented in [4]–. A high step-up converter and a step-down version integrating buck/boost and SC techniques are presented in [8] and [9], respectively.

The proposes a high step-up converter based on switched-inductor structure. With the combination of SC and switched-inductor techniques, a series of single-stage SC inductor converters is introduced in among these new techniques, the combination of coupled inductor and SC is most widely adapted for high voltage gain. Their common features are that the voltage conversion ratio can be regulated in pulse width modulation (PWM) mode; less active switches and magnetic components are employed. For instance, only one active switch and one coupled inductor are employed in the converters of implement high voltage conversion ratio. In this thesis we will talk about two application of high advance up dc to ac converter they are, (a) the displaying of grid associated PV ,(b) dynamic model of the induction motor created utilizing Simulink/MATLAB that can be utilized to think about the transient conduct of a motor-drive. The goal of this work is to investigate the exhibition and dynamic conduct of grid associated PV frameworks, and drive application.

II MODELLING OF DC TO DC CONVERTER

This boosted voltage is directly connected to multilevel inverters for AC voltage level. Another choice is first boost the low voltage and directly connected to the bridge inverters. Due to the normal structure the large step-up dc-dc converters used fly back and forward converters. In recent years, many new high step-up dc–dc converters were developed by utilizing some following techniques: switched-capacitor (SC), switched inductor, tapped inductor, and coupled inductor. In this thesis, high step-up zero-current switching (ZCS) converters implemented by using resonant SC methods. Among all new techniques.. In this proposed converter is used pulse width modulation technique to get large voltage conversion ratio, less magnetic components and active switches are employed. Only two active switches, one coupled inductor and one SC unit is used in this proposed converter.

The proposed high step up dc to dc converter has the following benefits.

1. High step up dc to dc converter gives the ultrahigh voltage gain.
2. Here low voltage level rated transistor can be used to improve the efficiency as the voltage stress.

. The proposed circuit here present high step up dc to dc converter in fig .no.1

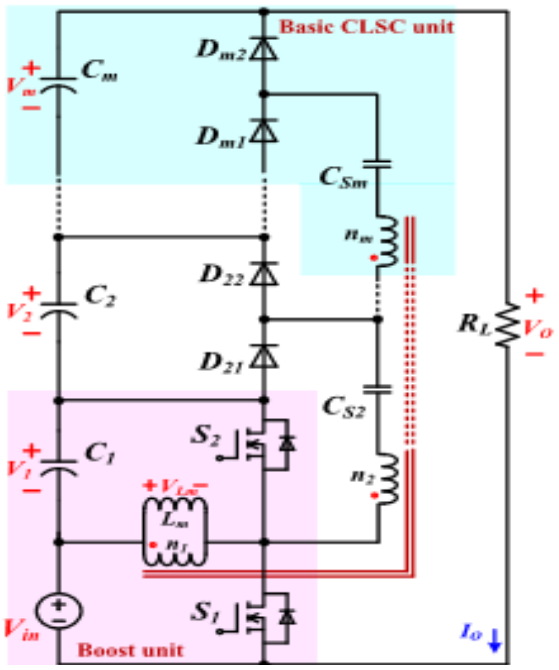

Fig.No. 1High Step up DC to DC Converter

Proposed step up dc to dc converter the circuit configuration of the proposed high step up converter is show in figure 3.1 .It is consist of a synchronous rectification boost unit and multiple coupled-inductor-SC (CLSC)units. Only one magnetic coupled inductor is connected in the proposed converter. Each CLSC unit includes two capacitors Ci and Csi, two diodes Di1 and Di2, as well as one winding having n_i turns of the coupled inductor; here i range from 2 to m. The synchronous rectification boost unit is made up of a dc input voltage source Vin, a pair of complementary conduction transistors S1 and S2, a filter capacitor C1, and the primary side winding with n1 turns of the coupled inductor. Filter capacitors C1 to Cm are connected in series with the input voltage source to provide the total voltage for load.

III.Literature survey

A large number of research papers and scholarly articles have been published on study and application of high step up dc to dc converter. The PV panels, low voltage DC sources and energy storage devices, like super capacitors, battery and fuel cells are generally needed to be boost to high voltage level for industrial and commercial applications

Literature required for structuring the research work of thesis is categorized as below

(1) Literature review on PV cell

(2) Literature review on PV cell with high step up dc to dc converter &magnetic coupled inductor.

(3) Literature review on high step up dc to dc converter with using soft switching technique.

H. Liu and F. Li, et. al. [3] “An epic high step- up dc-dc converter with a semi active exchanged inductor structure for a sustainable power source system is exhibited in this paper. The proposed converter is made out of two coupled inductors which can be coordinated into one attractive center, two capacitors, two active switches, and three diodes. The essential sides of coupled inductors are charged in parallel by the info source, and the auxiliary sides of coupled inductors are released in arrangement with the information source and two capacitors to achieve high advance up voltage gain with a fitting obligation proportion.

H. C. Liu and F. Li, et.al.[6] “In this paper, a novel high advance up dc-dc converter with an active coupled-inductor system is exhibited for a feasible energy system. The proposed converter contains two coupled inductors which can be incorporated into one attractive center and two switches. The essential sides of coupled inductors

are charged in parallel by the info source, and both the coupled inductors are released in arrangement with the information source to achieve the high advance up voltage gain with proper obligation proportion, individually. What's more, the aloof lossless clipped circuit not just reuses spillage energies of the coupled inductor to improve effectiveness yet additionally reduces huge voltage spike to restrict the voltage worries of the principle switches. The turn around recuperation issue of the output diode is likewise lightened by the spillage inductor and the lower part check is required; along these lines, the power transformation effectiveness can be additionally updated. This letter demonstrates the key waveforms of the proposed converter and the nitty gritty determination of the unfaltering state activity rule. The voltage change proportion, the impact of the spillage inductance and the parasitic parameters on the voltage increase are examined. The voltage stress and current weight on the power gadgets are represented and the correlations between the proposed converter and different converters are given. At long last, a model circuit evaluated 200-W output power is actualized in the lab, and the trial results demonstrate the satisfactory concurrence with the hypothetical investigation".

X. Hu and C. Gong et. al.et. al. [11] "The high-voltage gain converter is widely employed in many industry applications, such as photovoltaic systems, fuel cell systems, electric vehicles, and high-intensity discharge lamps. This paper presents a novel single-switch high step-up no isolated dc-dc converter integrating coupled inductor with extended voltage doubler cell and diode-capacitor techniques. The proposed converter achieves extremely large voltage conversion ratio with appropriate duty cycle and reduction of voltage stress on the power devices. Moreover, the energy stored in leakage inductance of coupled inductor is efficiently recycled to the output, and the voltage doubler cell also operates as a regenerative clamping circuit, alleviating the problem of potential resonance between the leakage inductance and the junction capacitor of output diode. These characteristics make it possible to design a compact circuit with high static gain and high efficiency for industry applications. In addition, the unexpected high-pulsed input current in the converter with coupled inductor is decreased. The operating principles and the steady-state analyses of the proposed converter are discussed in detail. Finally, a prototype circuit is implemented in the laboratory to verify the performance of the proposed converter."

K. C. Tseng and C. C. Huang [12] "This paper proposes a novel high-efficiency high-step-up interleaved converter with a voltage multiplier, which is suitable for electric vehicle power management applications. The proposed interleaved converter is capable of achieving high step-up conversion by employing a voltage-multiplier circuit. The proposed converter lowers the input-current ripple, which can extend the input source's lifetime, and reduces the voltage stress on the main switches. Hence, large voltage spikes across the main switches are alleviated and the efficiency is improved. Finally, a prototype circuit with an input voltage of 24 V, an output voltage of 380 V, and an output rated power of 1 kW is implemented and tested to demonstrate the functionality of the proposed converter. Moreover, satisfying experimental results are obtained and discussed in this paper. The measured full-load efficiency is 95.2%, and the highest measured efficiency of the proposed converter is 96.3%."

Y. P. Hsieh, J. F. Chen, T. J. Liang, and L. S. Yang et. al. [15]"A new high step-up voltage converter that combines a switch capacitor and isolated transformer, together with a passive clamp circuit, i employed to reduce voltage stress on the main power switch. The voltage stress of the power switch should be clamped to 1/4 *Vo*, and the proposed converter can achieve high step-up voltage gain with appropriate duty ratio. The energy of the leakage inductor can be recycled by the clamp capacitor because of the passive clamp circuit, and low On-state resistance $RDS_{(on)}$ of the power switch can be adopted to reduce the conduction loss. In this paper, several mathematical derivations are presented, CCM and DCM operating principle are discussed, and experimental results are provided to verify the effectiveness of converter topology. Finally, a 24-V-input voltage to 200-V-output voltage and a 150 W output power prototype converter are fabricated in the laboratory."

6.1 Conclusion

The proposed converter with PVA input is connected to three phase induction machines with high gain voltage output from the converter. The voltage at very low PVA is stepped up to a high

voltage High Step-up PWM DC-DC Converter with Coupled-Inductor and Resonant Switched Capacitor' circuit. the proposed converter can be extended for ultrahigh voltage gain by employing multiple CLSC units. The leakage inductance of the coupled inductor is utilized to achieve soft-switching of the diodes employed in the proposed converter. The voltage stress on the main switches is the same as that in the conventional boost converter with the same input voltage and duty ratio.

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