IJRETS: International Journal Of Research In Engineering, Technology And Science,
Volume XIII, Issue VIII, November.2020, ISSN 2454-1915, www.ijrets.com,
1st online international conference on informatics, robotics, construction & communication, 2020

A SINGLE PHASE TRANSFORMERLESS INVERTER FOR PV APPLICATION

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Abstract— **Recently multilevel inverters (MLI) have attracted more attention in research and industry, as they are changing into a viable technology for several applications. The concept of MLI was introduced for high power and high/medium voltage applications as they can provide an effective interface with renewable energy sources. Developing of reduced switch MLI topology has been a rapid research topic since the past decade. MLIs can generate higher voltage levels and also reduces the passive filter requirements. Diode Clamped MLI, Flying Capacitor MLI and Cascaded H-Bridge MLI are the conventional topologies. The number of components is directly proportional to the number of levels. Therefore, the reduced switch MLI topologies were introduced to overcome this drawback.. Multicarrier pulse width modulation technique is utilized for generating the quality of output voltage level. To prove the proposed multilevel inverter topologies feasibility, many comparisons are done with multiple performance parameters. Total Harmonic Distortion is the main parameter which is calculated using theoretical asymptotic time domain formula and the values are compared with simulation and experimental results.**

Keywords— MLI- MULTILEVEL INVERTER, FCMLI - FLYING CAPACITOR MULTILEVEL INVERTER, SDCMLI- SWITCH DC SOURCE MULTILEVEL INVERTER

I. INTRODUCTION

The inspection and investigation of power electronic systems had started a century ago and has encountered more than 100 years of advancement. The utilization of power electronic system has penetrated into an ever increasing number of applications during the past decade such as large motor drives, railway traction, Unified Power Flow Controllers, Static Var Compensators, HVDC transmission and STATCOM. Nowadays, the involvement of power electronic system has gained more popularity in renewable energy applications such solar, wind, fuel cell, hydrogen, biomass and ocean or marine energy.

In power electronic system, especially inverter technology plays a vital role in renewable energy application due to continuous strong interest in energy conversion process. So, the research pertaining to the inverter technology is more interesting and attractive in both academic and industry perspectives. Many industrial/modern applications require higher voltage and higher power like tens of kilo volts and mega-watts power range as the normal operating range. Therefore, the direct utilization of single switching devices for higher power range is more difficult and challenging. So, the intension is to introduce the idea of Multilevel Inverter (MLI) [1] concept to overcome the above said drawbacks.

For high voltage and high power application, the switching devices share the voltage stress in MLIs than in conventional inverters contingent upon the quantity of voltage level adopted. In the meantime, with expanding the number of level in output voltage will decrease the harmonic distortion on it. The utilization of MLI is adopted even in medium voltage application also with the benefits of lower switching losses and lower switching stress.

II. TRANSFORMER INVERTER

Voltage-fed inverter transformers are more common than the current-fed. Let Butler Winding custom design a voltage-fed inverter for your business needs. The term inverter is associated with several different electronic applications. In logic circuits inverter may be a logic inverter, the equivalent of a "Not" gate. In analogue signal processing, an inverter can be a circuit which inverts the phase of the signal being transmitted. In power conversion applications an inverter is an electronic transformer which converts power from a Direct Current (D.C.) source into Alternating Current (A.C.) power. Power conversion inverters can be divided into two sub-categories, voltage-fed inverters and current- fed inverters. Voltage-fed inverters are more common than the current-fed inverters. The electronic transformers used in inverter circuits are often called inverter transformers. Inverters produce A.C. power by switching the polarity of the D.C. power source across the D.C. power source€ ™s load. The early inverters used mechanical switches to do the switching. Vacuum tubes replaced mechanical switches in low power applications[1]. Eventually