DESIGN A COST EFFICIENT DC/DC CONVERTER WITH AN AUTONOMOUS PV BASED WATER PUMPING SYSTEM FOR AGRICULTURE MOTOR DRIVES

R. Karthick
Assistant Professor, Adhi college of Engineering Technology, Dr.APJ Abdul Kalam Centre for Research,Chennai, Tamilnadu, India
karthick.eee@adhi.edu.in

Abstract

This paper is to introduce the new method for improve the water propelling system on agriculture motors with an effective low cost boost converter. The converter thru to produce a high power to run commercial DC motor by the development on multi-resonant current-fed converter also be called as TIBCS the system which has reduce switches to have high lifetime, due to presents of electrolytic based capacitors the estimated cost of the converter is further down the nominal

Keywords: Sinusoidal Pulse Width Modulations (SPWM), Two Inductor Boost Converter Segments (TIBCS), Voltage Source Inverters (VSI)

INTRODUCTION

In the rural areas in the south India till facing the water dearth due to the unavailability of water resource and proper transportation such as pumping of water from source to rural places this work was developed in such places, the un-availability of electrical power face the water pumping system and water treatment system through available conventional. One of the efficient and way to solve this problems by PV solar energy. This mode of energy source becoming cheaper and has already proved been put to work several years without hung need of maintenance. Such a systems are already used for more than four decades commercial converters are based on an intermediate storage based system, performed with the lead-acid batteries, and DC drives to drive the water pumping system .The batteries' allow the motor system and pumping system to always under operate at its rated power even at in temporary conditions of very low solar radiation[2]. This facilitates of coupling the electric dynamics to the solar panel unit and the motor drive used for pump the water The design of DC motor drive system directly fed from a PV source demands to face the challenges of operating under variable load restrictions and still maximum energy produced by the system module and the rate of water pumped. To meet the require demand the use of converter need to follow the following states: Better efficiency-due to the poor energy availability[5], low cost – to use its deployment at most needed, autonomous operation – not required specific training to operate the system, robustness –minimum rate of maintenance possible, and very high life cycle – the usable life span of 20 years of PV system This paper proposes the new DC/DC base converter control and control sequence segments for photovoltaic (PV) water pumping system and water treatment that overcome most of the required aforementioned features.

PROPOSED CONVERTER

This project proposes a new DC/DC base converter for DC motor drive applications. The model of system is design to achieve more efficient, flexible, low maintenance and reduced cos than the standard drives that uses DC motor drives or medium voltage based synchronous motors drives. The developed model system is based from the current-fed multiresonant converter also named as Resonant fed voltage to Two Inductor Boost Converter Segments (TIBCS) and a Full-Bridge based Three-phase nominal Voltage Source Inverters (VSIs).The classic topology of the TIBCS has some features like high voltage gainer and low input current and voltage ripples. In this base work, it further improved the use of non-isolated system recovery snubber through with a hysteresis current controller and the implementation of constant duty cycle ON time and OFF time control to improve efficiency To ensure low maintenance cost and accessibility on the proposed model system, it was developed to use a single and multi PV modules. The model system should able to drive the low power water pump with high voltage capability, from the range up to 1/3 HP, more ever enough to produce supply water for a small family. From the base circuit it presents an overview for the proposed system model. The energy extract by the panel is given to the motor drive through the converter with one or two power mode stages: the DC/DC TIBCS stage to boost the voltage from the panel board and the DC/AC three phase inverter has to convert the DC voltages to three-phase AC voltages. The inverter based on the classic topology (1.Three legs, 2. Two switches per leg) and it uses the sinusoidal pulse width modulations (SPWMs) strategy with 1/6 to optimal third order harmonic voltage to be injection as in proposed module [4].