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Novel Hybrid Multi Source Converter For Agriculural Pumping System With Hybrid Renewable Energy Source

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ABSTRACT: The main purpose of the paper is to organize technical based farming to the welfare of modern irrigation system . Basically the farmers are not able to get all bi-products at all important times. Water is essential part of farming which is primary towards operating them in efficient way. The pumping system mainly includes motor like DC motor, Induction motor and special electrical machines that is primarily induction motor is widely used. The converter topology widely comprises of basic inverter and rectifier[1]. In this project the design is setup towards universally adapted towards all sorts of motor configuration in accordance with that the system is designed to have CUK and SEPIC converter will be connected with hybrid energy source that output of which will be boosted up to four times the given input. Incase if AC motor or special electrical machine is connected we have a inverter with specialized space vector pulse width modulation technique is optimized. Also the hybrid converter will make use of MPPT topology with incremental conductance algorithm. Thus, making system more efficient towards all sorts of scenario.

Keywords: Space vector pulse width modulation, incremental conductance, hybrid converter

1. INTRODUCTION

In the real world, the solar energy-to-shoot-water is the most promising alternative to the traditional ci-based electric pump, the system is in remote areas, where there is no electricity[2]. The use of solar photovoltaic (PV) as a source of energy for the water pump is considered to be one of the most promising areas for the application of PV, in particular, in agriculture, in remote areas, as the output of direct solar radiation (sunlight to electricity, energy, irrigation systems, irrigation and livestock production. The advantages of the use of water pumps are up and running with a system for a solar cell includes a bottom, a repair,

software installation, ease of use, reliability, and the match between the capacity and water needs. In addition, the photovoltaic pump system, you can use the water in the tanks instead of the battery[10]. The disadvantages of using the solar energy, the water pump is a very low efficiency, it is a kind of based on a number of factors such as solar radiation, temperature and humidity. The other thing is a DC-to-DC converter with high voltage gain is required[3]. Thus, several solutions have been proposed, but it is limited, the increase in voltage and a large number of the power of the keys. In this paper, we propose a new DC-converter based on a combination of topology SEPIC-CUK.

2. EXISTING METHODOLOGY

In existing system boost converter has been used for water pumping system. The boost converter is used for increasing the voltage obtained from the panel and it is stored in a battery. The power for both microcontroller and relay to operate is utilized with the help of battery[4]. Moisture sensors are being placed on the field and these sensors continuously sense the water content in the soil. Based on the level of water content, microcontroller will turn on and off the motor with the help of relay[9].

3. PROPOSED METHODOLOGY

The proposed topology is based on the integration of the traditional Sepic, and Cuk converters, but it requires only a power supply of the semiconductor junction[8]. It is characterized by an increase of the static voltage gain in comparison with the classical topology of the boost, and the low-voltage, power switch and light-emitting diodes[5]. The system will have to be done with the help of the world to the MPPT algorithm, which will be run on the proposed DC-to-DC converter. In order to confirm the characteristics of the proposed power converter, and the global water pump system, and a number of simulation and experimental results are presented [6].

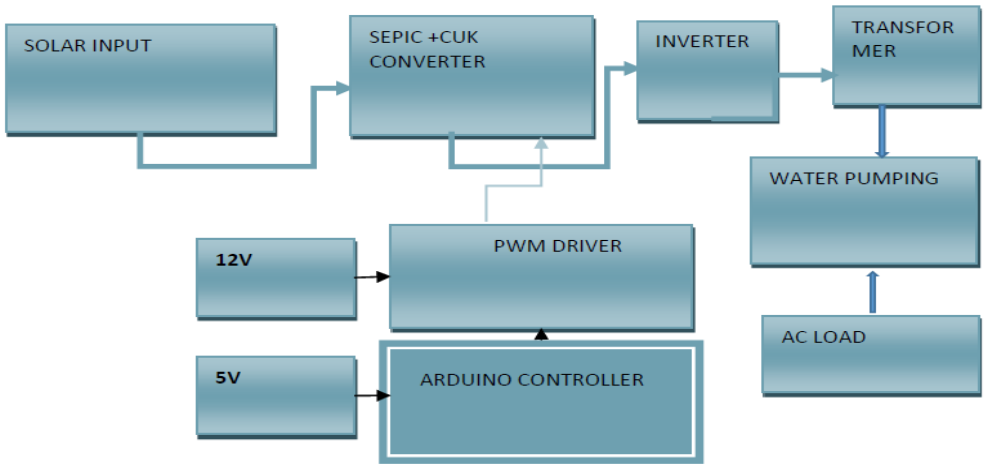

Fig 1. Hardware Block Diagram

The proposed block diagram is shown in fig,1 for hardware setup inorder to develop hybrid converter with the topological enhancement thus making it proper working towards

all sorts of situation.The arduinocontroller helps to get better benefits of providing proper pulse squence.PWM DRIVER helps to enahance the signal sequence.

CIRCUIT DIAGRAM:

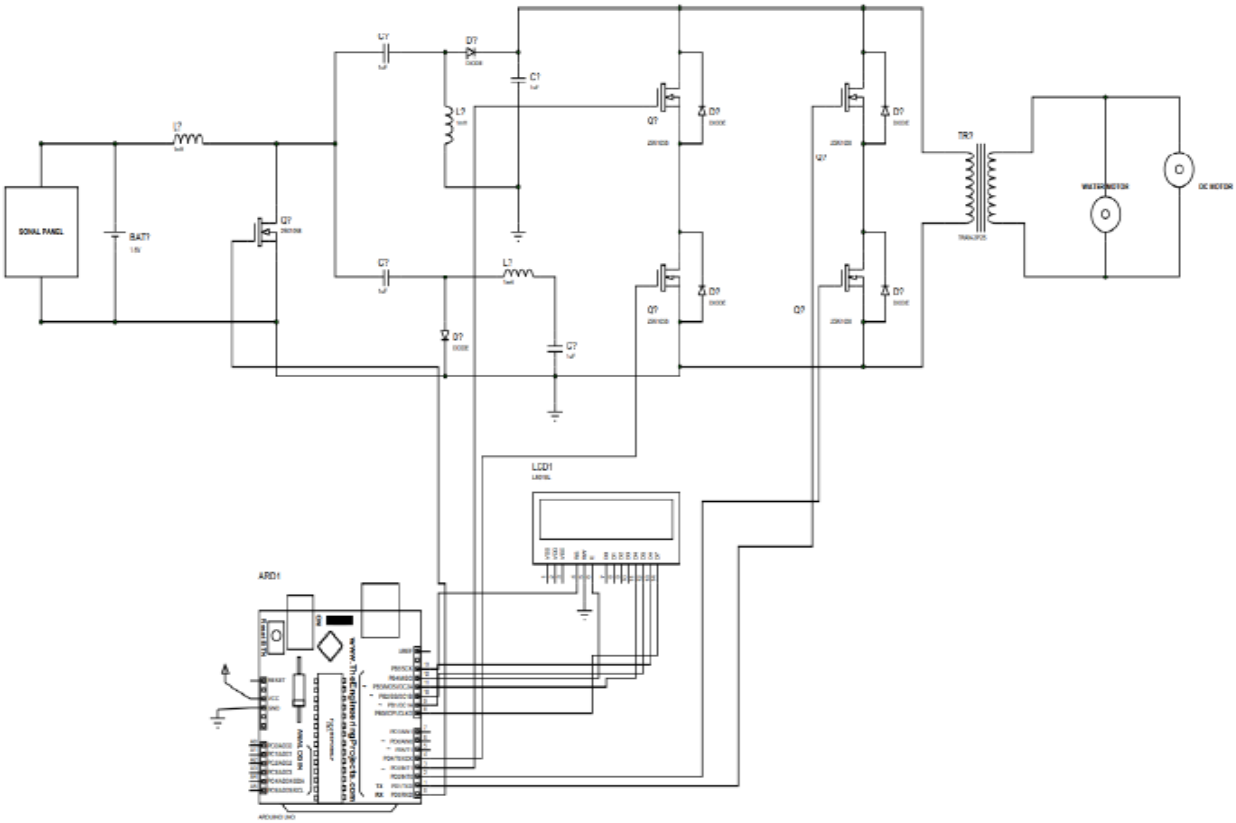

Fig 2.Circuit diagram

The circuit diagram mainly constitutes of the arduino controller that helps to achieve the mosfets to gain the pulse driver circuit to enhance the supportive system.The hybrid converter helps to achieve the enhanced output from it.The MPPT Circuit with incremental conductance algorithm for better output[7].The Fig 2.shows the circuit diagram of the system that is necessary for the load to pump the water.The agricultural system mainly deals with the proper pumping of water to the plants at proper time[9].The major time consumed in agricultural system is proper watering to the plants at proper time.The system delivers a maximum efficiency of 92%.

4. SIMULATION RESULT:

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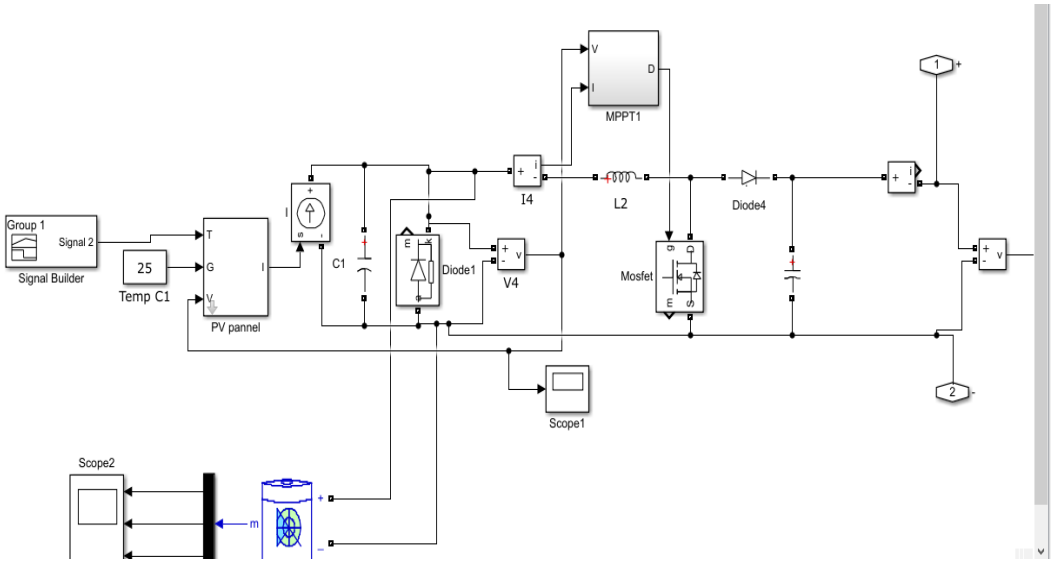

Fig 3.Simulation Circuit

In fig 3simulation diagram there is enough possibility to convert the hardware to software thus the measurement of voltage and the response with the battery charging and discharging ratio was measured[12].

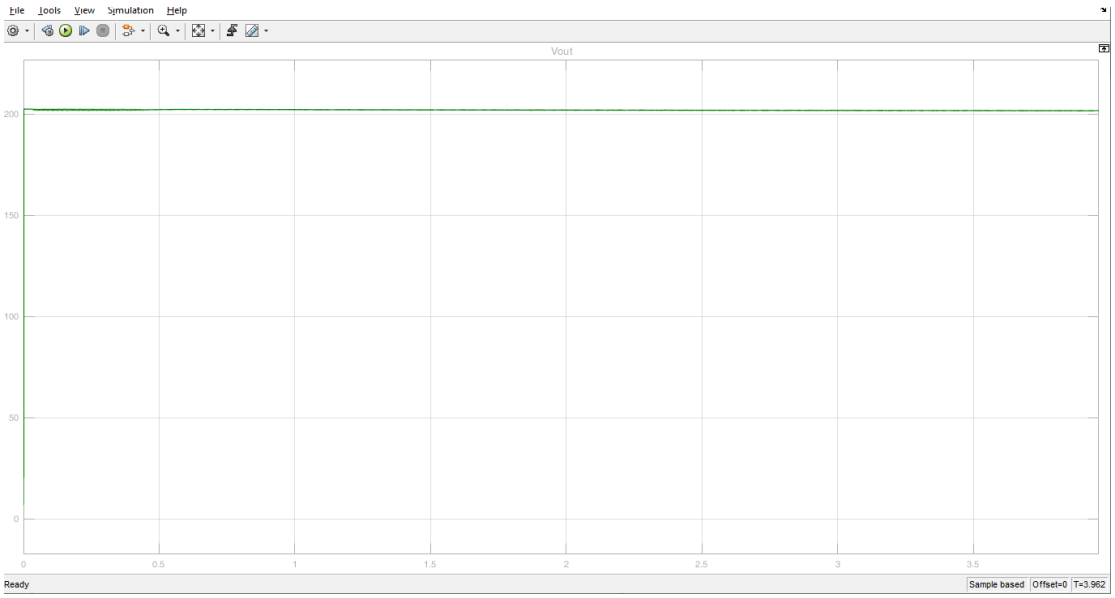

Fig 4 Input Voltage Response

In fig 4 the input voltage response was materialized with which boosted voltage is taken from hybrid converter and hence its such easy to calculate the values

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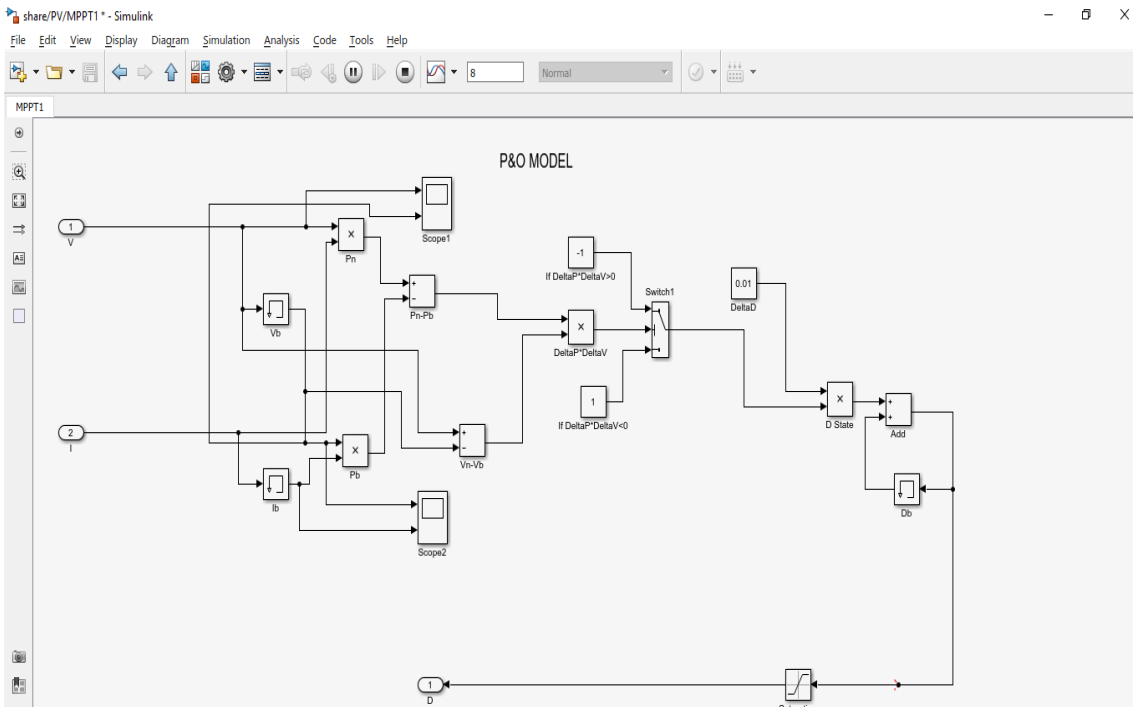

Fig 5. MPPT Simulation Diagram

In fig 5 MPPT simulation topology was designed by means of the incremental conductance algorithm which enhances solar PV output

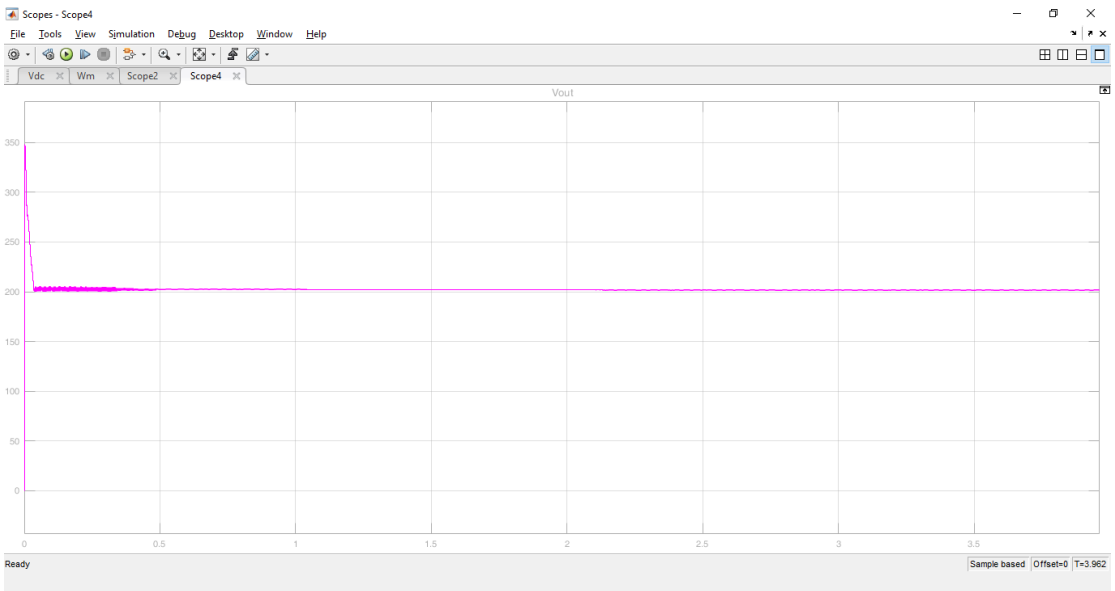

Fig 6. Boost Voltage Response

In fig 6 &7 it has the possibility to measure the boost voltage response and battery storage response for which majority of pumping devices will get deviated if the values are not ideal[13].

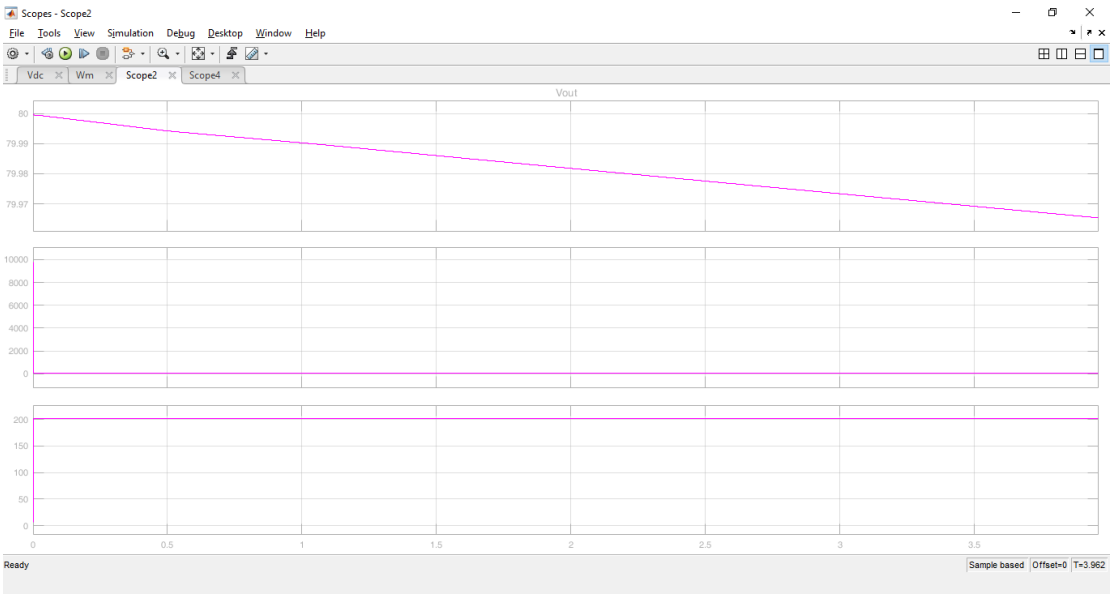

Fig 7. Battery Storage Response

5. CONCLUSION

This experience was first introduced to the new, non-isolated Sepic converter-Cuk DC-to-DC), manual of water supply. This promotion converter is the condition of high-voltage characteristic of the profits, and double the output. This is a conversion device that is actively changing the power supply, so as to ensure the ease of the drive, as suggested by this link is forced to a basic, which is related to the earth. In addition to this, the converter represents a continuous input and output current. We are a power inverter to pump the water with just the right flow of water at a constant speed, the load, the ac integration of the system, we can control the AC loads using the water pump in the system.

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