Ilkogretim Online - Elementary Education Online, 2020; Vol 19 (Issue 4): pp. 6835-6842
http://ilkogretim-online.org
doi: 10.17051/ilkonline.2020.04.765088

Hybrid Power Supply Using Renewable Energy Resources

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ABSTRACT

This study aimed to reveal eco-friendly power generation from renewable resources. It dealt witheffect of soil properties on the generated electricity and the diversity of soil source. Soil can be used to generate electrical power in microbial fuel cells (MFCs), which convert chemical energy from soil organic compounds into electricity via catalysis by soil source. Light emission from sun is converted into electrical energy by PV systems. As the output from both sources are converted into a single output by using dual input single output dc- dc boost converter. Among various renewable resources this could be a special one because of its availability, low cost. In future this could be a better solution for pollution free power generation and it may replace the conventional resources.

I. INTRODUCTION

Renewable energy resources are one of the most efficient resources for single user consumers that are for home appliances. This renewable energy resource can be generated safely even at the home itself it is major advantages of the renewable energy resources so only in most of the developed nation are working on the implementation more renewable energy resources. There is also lot of ideas going on for the huge extraction of the renewable energy resources and there are many new technologies for finding new invention of renewable energies. This is what our project is based upon we are also implementing the renewable energy source of running a load. In our project we are implementingtwo renewable energy sources they are one is solar photovoltaic panel and earth battery. As the energy from the sun is extracted through this solar panel. In this solar panel maximum power can be abstracted from maximum power point tracing system. The energy from the soil is extracted through the earth rods. For these earth rods we are using two metals they are copper and zinc. The copper rod is used to observe positive charges

and the negative charges are used to observe the negative charges. This two renewable energy resource are safer, environmentally safe. By using this two renewable energy resource we are able to run a load. In our project by using this two renewable energy resources we are running a Brushless DC motor as the load. It is operated in a variable speed by varying the switch operation.

OBJECTIVE

- To reduce the use of conventional resources.

- To avoid emission of unhealthy hazards andpollution.
- To reduce the large capital cost investments onconventional sources.
- To generate electric power in a safer manner.

II. PROPOSED SYSTEM DIAGRAM:

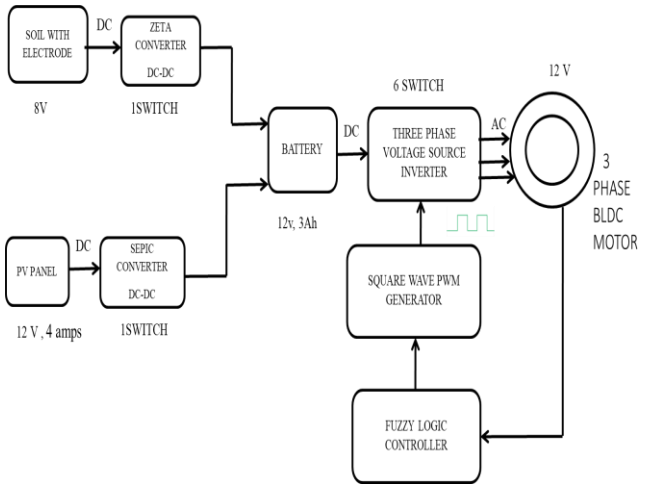


Figure 1 Proposed system

This power generation technique use soil and PV panel as a resource. ZETA converter boosts the input voltage from soil and PV panel. The energy storage device stores energy from zeta converter. Three phase voltage source invert the dc voltage from battery into 3 phase ac supply. The output voltage is directly fed to three phase BLDC motor. The output
from the motor is feedback to the fuzzy logic controller to producer an square wave to the tune switches present in three phase VSI respectively.

Brushless DC Motors. BLDC motors are superior to brushed DC motors in many ways, such as ability to operate at high speeds, high efficiency, and better heat dissipation. They are an indispensable part of modern drive technology, most commonly employed for actuating drives, machine tools, electric propulsion, robotics, computer peripherals and also for electrical power generation. With the development of sensor- less technology besides digital control, these motors have become very effective in terms of total system cost, size and reliability.

It has no mechanical commentator and associated problems. High efficiency due to the use of permanent magnet rotor. High speed of operation even in loaded and unloaded conditions due to the absence of brushes that limits the speed. Long life as no inspection and maintenance is required for commutator system. Quite operation (or low noise) due toabsence of brushes.

CONVERTERS AND INVERTERS

Single-Ended Primary-Inductor Converter (Sepic) is a type of DC-Converter allowing the electrical potential voltage at its output to be greater than, less than, or equal to that at its input; the output of the SEPIC is controlled by the duty cycle of the control transistor. A SEPIC is similar to a traditional buck- boost converter, but has advantages of having non-inverted output (the output has the same voltage polarity as the input).

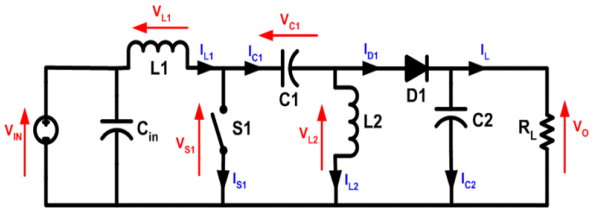


Figure 2 operation of converter

The SEPIC converter exchanges energy between the capacitorsand inductors in order to convert from one voltage to another. The amount of energy exchanged is controlled by switch S1, which is typically a transistor such as a MOSFET; MOSFETs offer much higher input impedance and lower voltage dropthan bipolar junction transistors (BJTs), and do not require biasing resistors (as MOSFET witching is controlled by differences in voltage rather than a current, as with BJTs).

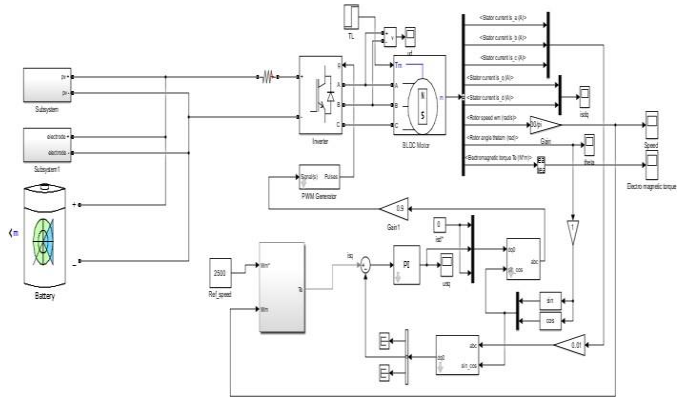
ZETA CONVERTERS:

Similar to the SEPIC DC/DC converter topology, the ZETA converter topology provides a positive output voltage from an input voltage that varies above and below the output voltage. The ZETA converter also needs two inductors and a series capacitor, sometimes called a flying capacitor.

Unlike the SEPIC converter, which is configured with a standard boost converter, the ZETA converter is configured from a buck controller that drives a high-side PMO. The ZETAconverter is another option for regulating an unregulated• input-power supply, like a low cost wall wart. To minimize board space, a coupled inductor can be used. This article explains how to design a ZETA converter running in continuous-conduction mode (CCM) with a coupled inductor. Converters like it have both the properties of buck and boost converter (means it can act as a step up/down converter). It is non inverting polarity type means it gives non inverting output it can be design to achieve low ripple output current and as it has lower settling time, adaptability etc.

The output voltage varies by varying the duty cycle by using microcontroller. We are using ac supply and solar PV panel asa multiple input to our converter. It shows that the converter is multiple input to single output which can be called as a zeta converter. While the design of ZETA**.** Converter is done on MATLAB. Day by day the renewable energy sources are becoming more popular and more importance given to it as it free form pollution, low maintenance cost, etc. So we are including solar PV panel as an input as well as ac supply. The zeta converter is nothing but the DC to DC converter which are widely used as an application in traction motor, power factor correction battery charging, etc. The zeta converter is 90-93% efficient.

III. SIMULINK PROPOSED SYSTEM:



OUTPUT FROM PV:

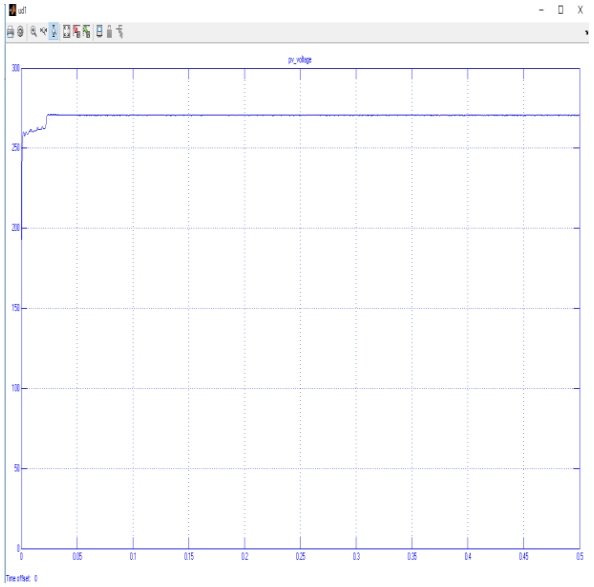


Figure 3 Output from PV

SOIL WITH EARTH ELECTRODE

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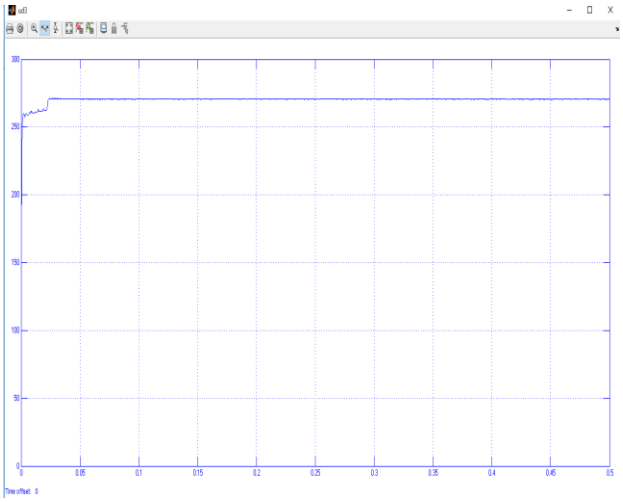


Figure 4 output from Earth Electrode

SPEED OF THE MOTOR

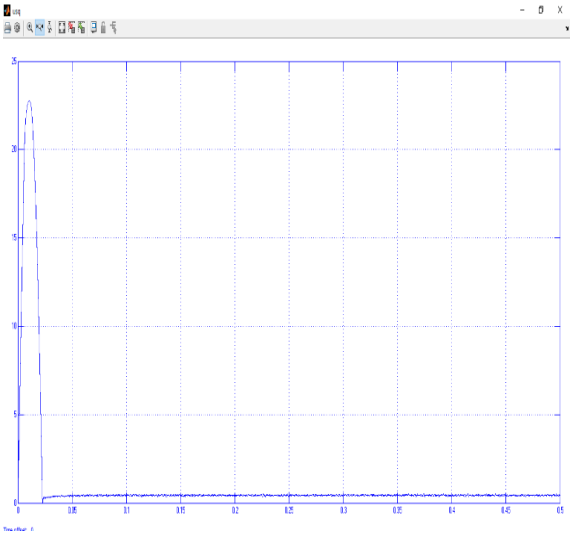


Figure 5 Speed of the Motor

INVERTER OUTPUT:

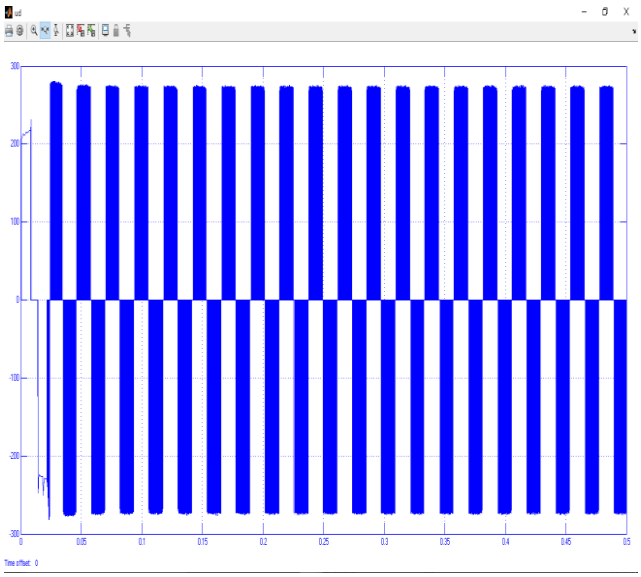
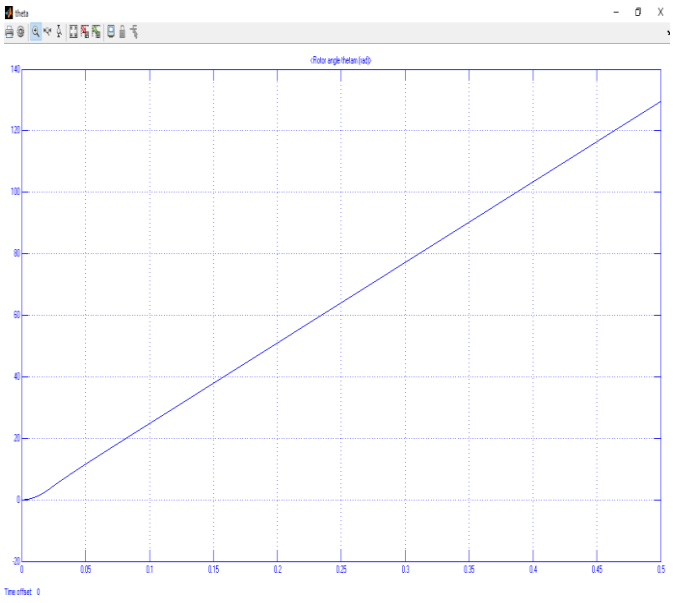
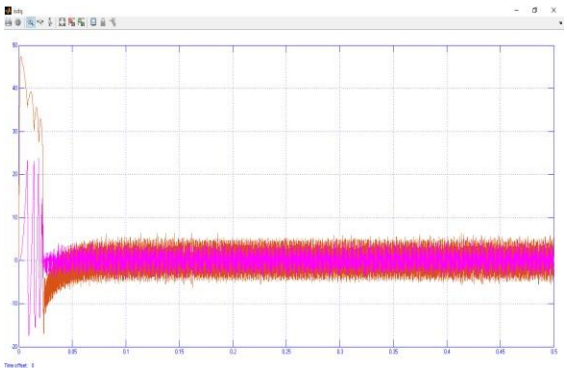


Figure 6 Output of the Inverter

ROTOR ANGLE:



BLDC MOTOR CURRENT:



IV. CONCLUSION

A Sepic and zeta converter are used to convert the dc to dc source and it is combined and stored in a battery and power is required for the operation of the motor and has been designed and adjustable speed such as low speed , medium speed and constant speed applications for applying the variable speed. Minimum switching losses have been achieved by low-frequency switching operation of VSI with variable voltage control of DC bus for controlling the BLDC motor speed. An FLC has been used to produce PWM pulses. Experimental performances of the system have been established quite well for the control of speed over a broad range of supply. A comparative study has also been made between the existing and proposed system. Thus PF near to unity can be easily attained for a wide range of speed with higher efficiency. The performance of the system can be analyzed for various controllers.

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