ABSTRACT

PV systems are one of the most utilized renewable systems due to their simpler integration, these systems possess a low voltage output which needs to be boosted in order to meet the load requirements. A variety of the dc-dc converters are introduced to boost the PV voltage, suffers from the efficiency and higher duty requirements, as the voltage requirements of the loads are very far from the PV inputs make the job very tougher, plenty of dc-dc converters provide the required voltage gain, but result in poor efficiency due to higher duty requirements. In order to resolve these issues this research work deals with two variants of DC-DC converter: Modified SEPIC converter, Lift LUO-converter. Both converters are studied for their performances under voltage gain, which shows the lift LUO-converter provides better efficiency, with higher voltage gain along with lower duty ratio compared to the modified SEPIC converter, hence the LUO-converter is enhanced with a triple mode control along with the PV solar tracking for PV pumping applications. Under solar input also the LUO-converter provides a peak efficiency of around 95% while larger power oscillations are generated, As the converter voltage gain is dependent on the lifting stages the lower duty ratio is required, this property makes the converter suitable for low power input dc-applications.

A photovoltaic array is created to guarantee that rated DC voltage is received by BLDC motor-pump under typical test circumstances and that maximum switches use of Luo converter is achieved. The BLDC drive's speed is modulated by a voltage source inverter and a variable DC-Link capacitor for pumping applications. Voltage lift is the most common approach used in electronic circuit design. It shows the evolution of voltage in an arithmetic progression. It uses a Super-lift converter, which is often used in solar PV applications, to produce voltage rises in a geometric progression. It has a significant impact on the transfer gain in power series. The BLDC drive may be

started smoothly with the Luo converter if the positive output super lifts are properly managed to utilize an upgraded control approach. A maximum power point tracking technique has been shown to outperform previous systems in the face of unexpected environmental changes.

Different types of LUO converters are used to analyze the performance of a BLDC motor. The Luo converter is used to reduce the ripples in the output current and voltage of the device. The suggested drive for a photovoltaic-based water pumping system outperforms the simulation of various Luo Converters. To maximize PV panels' output, the MPPT controller employs the Incremental Conductance approach. The circuit was modeled and simulated in MATLAB. In this work, the Positive Output Luo Converters give better performance than Negative output and Double output Luo Converters.

This research work aims at managing the power consumption in smart cities, especially in urban areas. With the constant and tremendous increase in the rate of urbanization in the recent few decades, it has become highly inevitable to prevent the increase in power consumption. This problem can be harnessed in outdoor units by using positive output Luo converter which consists of three levels of voltage lifting technique to manage energy consumption in street lights by using solar energy. This device periodically activates and disconnects street lamps during the day and night, by detecting the intensity of light via the LDR sensor. This aids in converting low voltage to high voltage of 200-250 Volts using Voltage Lifting Technique and power is supplied to street lights. The usage of the three levels of lifting technique makes it possible to supply power even during rainy and cloudy periods. People being callous do not take care to turn off indoor electrical gadgets after use. Sensors such as the PIR sensor and DHT11 can automatically control their usage by switching off the loads when no person is detected in the room. This Research work reduces power consumption and thereby energy can be saved in the future.