



# **Design and Validation of High Step-Up Converter with Low Voltage Stress by Using Two Stage Switched Capacitor**

V.B.Balaji<sup>1</sup>, G.Kishore<sup>1</sup>, R.Mohanraj<sup>1</sup>, M.Mukesh<sup>1</sup>, Dr.V.Thirumurugan M.E., PhD<sup>2</sup>

B.E (EEE) – IV Year, Dept. of EEE, The Kavery Engineering College, Mecheri, Salem, Tamil Nadu, India<sup>1</sup>

Assistant Professor, Dept. of EEE, The Kavery Engineering College, Mecheri, Salem, Tamil Nadu, India<sup>2</sup>

**ABSTRACT:** The project development of photovoltaic applications with highly reliable and efficient converter and inverter equipped with advanced control strategies, which made the photovoltaic system compatible for higher power ratings. In this project of solar PV modules are interconnected to generate abundant electrical energy which is connected to an interleaved boost converter the energy is evacuated to the load. The interleaved boost converter characteristics are controlled using neural network for to maintain the constant output.

**KEYWORDS:** MPPT, PV cell, High step up converter, Low voltage stress, Coupled inductor

## **I. INTRODUCTION**

Nowadays, with global energy shortage, renewable energy resources have turned the attention of many researchers. Among renewable energy technologies Photo- Voltaic (PV) system is one of the most widely used technique. Generally in PV power generation system two main problems occur, that is power generation varies with weather condition and its low conversion efficiency. A DC to DC high step up converter is very essential to overcome the inherent low voltage characteristic. These converters were widely used in many applications such as automobile head lamps as a high-intensity discharge lamp, Uninterruptible Power System (UPS) and also for the communication power system. Conventional converter has been used to provide high step up gain, but it has a drawback of high voltage stress on the switches, which makes high performance low voltage devices unsuitable.

To produce high step up voltage gain many topologies have been presented with a minimum duty ratio with simple structure DC-DC fly back converter generates a high voltage gain. Due to leakage inductance of transformer there is a high voltage stress on the active switches, and the voltage stress on the active switches can be clamped using few Energy-Regeneration techniques

## **II. MPPT**

Maximum power point tracking is a technique used to achieve maximum power from photovoltaic devices. MPPT works under various algorithms. The ability of this algorithm is to detect the output which is the most important factor to be considered in choosing MPPT technique. At different points irradiance levels on the solar panel surface varies. Due to this variation in one system, there may be multiple local maximum power points. There are several publications that deals with MPPT, but each technique has its own drawbacks. In this paper neural logic control is used for maximum power point tracking. Neither integral nor proportional control loop exists in this system and the control signal is generated by fuzzy logic controller. By comparing other artificial intelligence control methods like neural network and genetic algorithm, this method proven to be fast and robust.

# International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: [www.ijareeie.com](http://www.ijareeie.com)

Vol. 8, Issue 3, March 2019

### III. BLOCKDIAGRAM

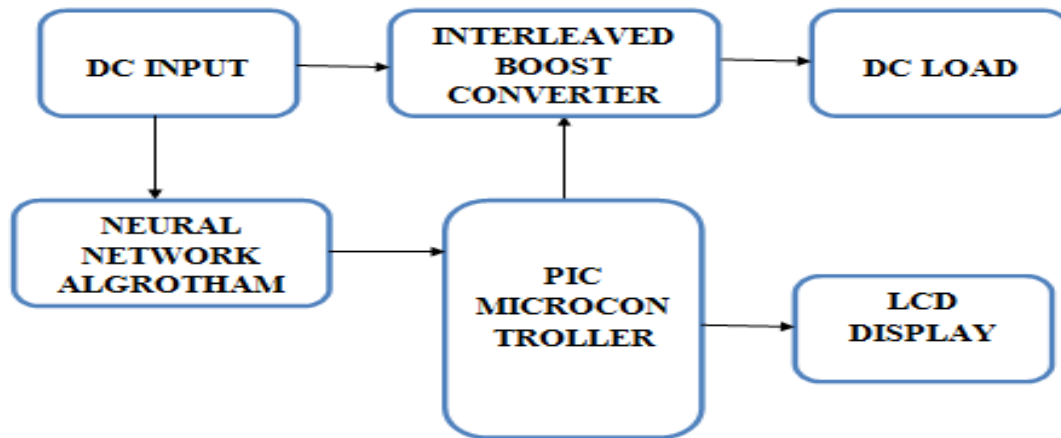


Figure1:proposed method system

### IV. EXISTING SYSTEM

Fast and unconditionally stable maximum power point tracking scheme with high tracking efficiency is proposed for photovoltaic generators. The fast dynamics and all range stability are attained by a sliding mode control and the high tracking efficiency by a maximum power point algorithm with fine step. In response to a sudden change in radiation, our experiments show a typical convergence. This is the fastest convergence time reported to date. In addition we demonstrate stable convergence all across the photovoltaic curve, from short-circuit to open-circuit. The theory is validated experimentally.

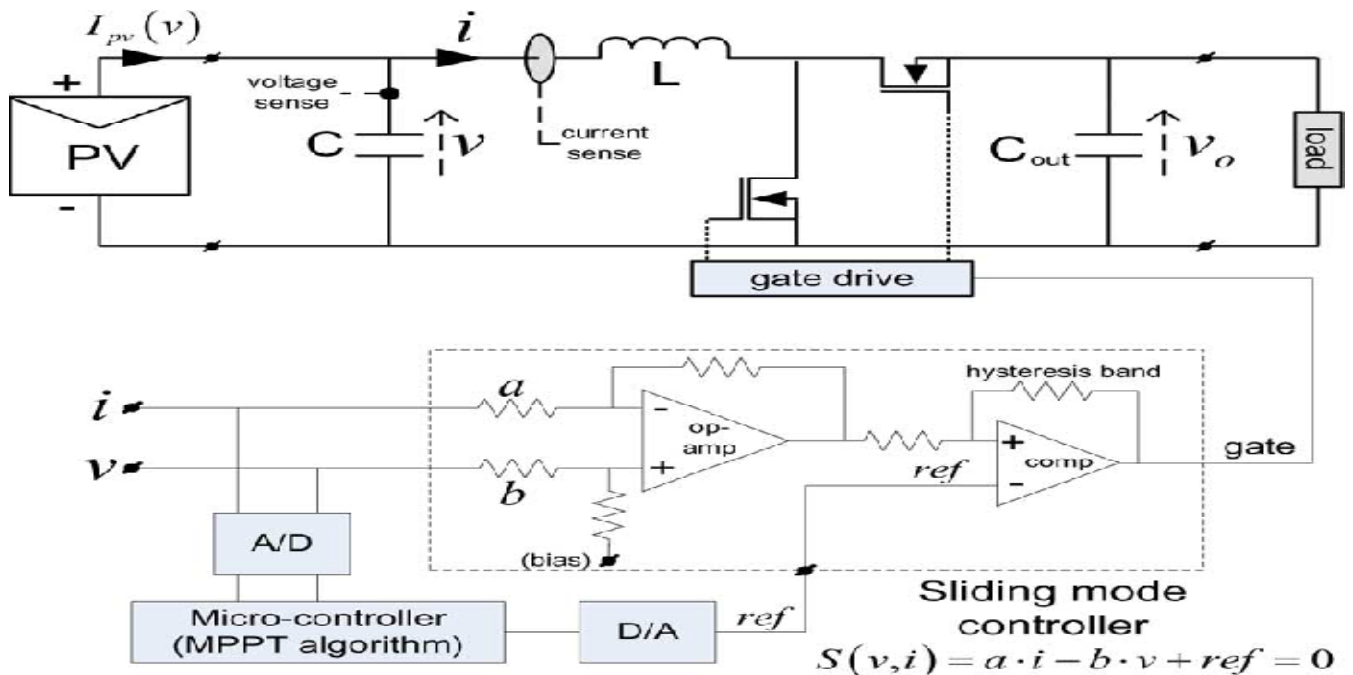


Figure2.interleaved boost converter

# International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: [www.ijareeie.com](http://www.ijareeie.com)

Vol. 8, Issue 3, March 2019

## V. INTER LEAVED BOOST CONVERTER

The interleaved boost converter, it operates depending upon the Interleaving property. The circuit contains two boost converters in parallel operating 180° out of phase. The inductor's ripple currents are out of phase, so they tend to cancel each other and reduce the input ripple current caused by the boost switching action. The input current is the sum of the two inductor currents  $I_{LB1}$  and  $I_{LB2}$ . Moreover, the effective switching frequency is increased by switching 180° out of phase and introduces smaller input current ripples. So the EMI filters in the input side will be smaller.

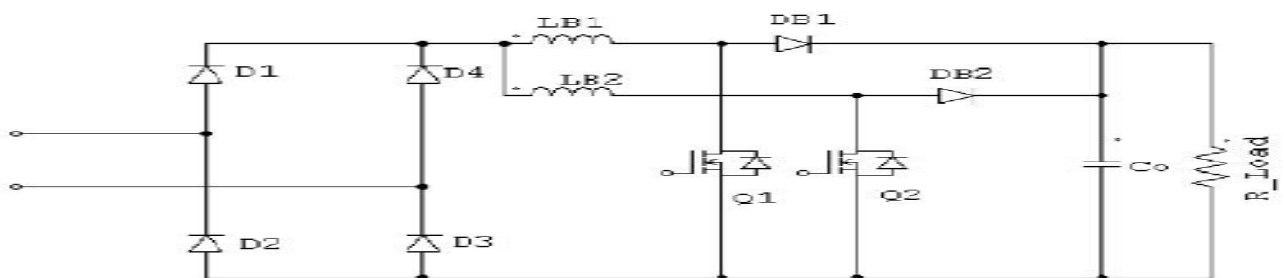


Figure3: circuit diagram of exciting system

## VI. ARTIFICIAL NEURAL NETWORK

For the innovation and development of better control systems, the design and implementation of intelligent systems has become an essential factor. In such a situation, the implementation of artificial neural networks gives solutions to the questions that linear systems are not able to solve.

Artificial neural network is an emulation of our human brain. The understanding, recognizing, classifying, clustering, error detection and correction is the sixth sense of human brain and this capability is incorporated with the help of artificial neural network. This is an emulation of biological neural system. Neural network can be said to resemble human brain in following the below mentioned things

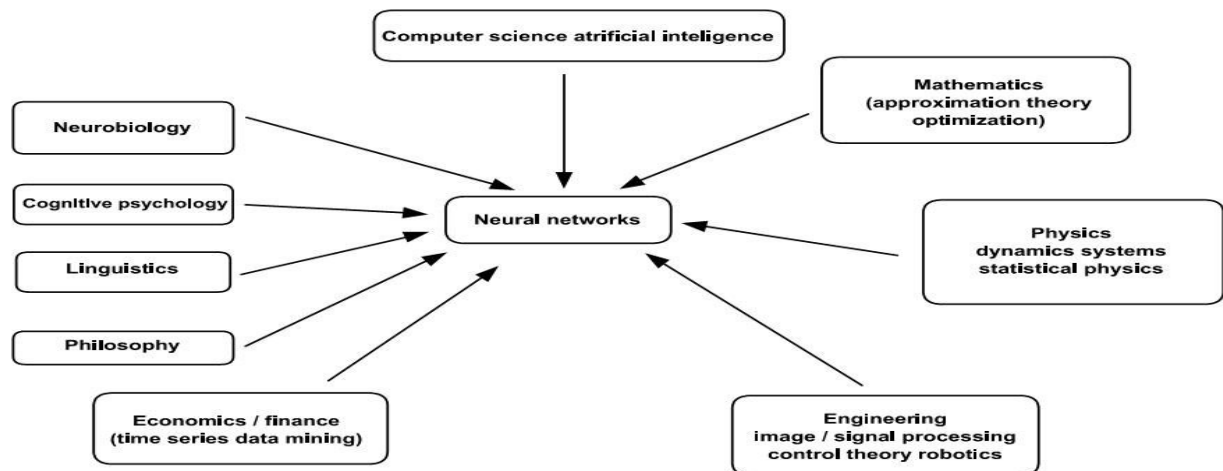


Figure4 Neural Network



# International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

*(A High Impact Factor, Monthly, Peer Reviewed Journal)*

Website: [www.ijareeie.com](http://www.ijareeie.com)

Vol. 8, Issue 3, March 2019

## VII. CONCLUSION

The progress in science & technology is a non-stop process. New things and new technology are being invented. As the technology grows day by day, we can imagine about the future in which thing we may occupy every place.

The proposed system based on Atmel microcontroller is found to be more compact, user friendly and less complex, which can readily be used in order to perform. Several tedious and repetitive tasks. Though it is designed keeping in mind about the need for industry, it can extended for other purposes such as commercial & research applications. Due to the probability of high technology used this is fully software controlled with less hardware circuit. The feature makes this system is the base for future systems.

## REFERENCES

- [1] Mirbagheri S.Z, Mekhilef S, Mirhassani S.M, “MPPT With Inc. Conductance Method Using Conventional Interleaved Boost Converter”, Energy Procedia 42, 2013.
- [2] Ayvazyan GY dkk, “Maximum Power Operation of PV System Using Fuzzy Logic Control”, Armenian Journal of Physics, Volume 1, 2008.
- [3] Kumar Yadav P, Thirumaligh S, Haritha G, “Comparison of MPPT Algorithm for DC-DC Converter Based PV System”, International Journal of Advances Research in Electrical, Electronics and Instrumentation Engineering Vol 1 Issue 1, 2012.
- [4] M. Rifa'i&RatnaIka P, “Pemodelandan Analisis Panel Photovoltaik”, Conference Informatic, Telecommunications Electrical Engineering. UGM Yogyakarta, 2012.