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Modeling and Simulation of Photovoltaic System using Boost Converter with MPPT and Connected to Grid

• **Prashant Kumar Singh** • **Ramswaroop**

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Abstract: *The recent upsurge in the demand of the PV system is due to the fact that they produce electrical power without hampering the environment by directly converting the solar radiation into electric power. However, the solar radiation never remains constant, it keeps on varying throughout the day. The need of the hour is to deliver the constant voltage to the grid irrespective of variation in solar insulation and temperature.*

This paper represents the analysis of modeling and simulation of photovoltaic system with MPPT and connected to grid. It also describes a maximum power point tracker for a photovoltaic system using MATLAB software. The maximum power available from PV system is strongly dependent on weather conditions. So, in order to maximize the efficiency and reliability, it is desirable to predict the maximum power available from PV system. The maximum power point tracker along with the PV module and DC-DC boost converter has been simulated. The simulation results show that the system is capable of predicting the maximum power point correctly under different environmental conditions. Then we coupled the PV array with the boost converter in such a way that with variation in load, the varying input current and voltage to the converter follows the open circuit characteristic of the PV array closely. At various insulation levels, the load is varied and the corresponding variation in the input voltage and current to the boost converter is noted. The power is supplied to the different types of A.C. loads that are termed as standalone by the series and parallel combination of single cell module after that PV module is connected to the grid.

Keywords: *dc-dc boost Converter, Maximum Power Point (MPP), Maximum Power Point Tracking (MPPT), Photovoltaic (PV).*

Prashant Kumar Singh
PG Scholar, Department of Electrical Engineering, Shekhawati Institute of Engineering & Technology,
Sikar, Rajasthan, INDIA
E-mail : prashantsinghen07@gmail.com

Ramswaroop
Assistant Professor, Deptt. of Electrical Engineering, Shekhawati Institute of Engineering & Technology,
Sikar, Rajasthan, INDIA
E-mail : burdak.ramswarooop@gmail.com

Introduction :

The 21st century has brought focus on energy crises. Due to this, many researchers are moving towards developing renewable energy. Renewable energy is a source of pollution-free and green energy. Among all renewable energy sources, solar and wind energy are considered to be good sources. The biggest challenge in developing a photovoltaic system is to track maximum power point (MPP) in the shading condition and dynamic atmospheric conditions because MPP varies with change in variation of parameters like temperature and irradiance. To track maximum power point, there are many maximum power point tracking