

SolarInnovate Energy Solutions

Solar Constant Voltage System



Overview

Constant voltage MPPT systems are designed to maintain a consistent voltage output, typically 12V or 24V, regardless of input voltage fluctuations from solar panels. How a DC-AC inverter is used in batteryless solar PV?

In batteryless solar PV, the output voltage of solar PV always varies according to solar irradiation, temperature, so that it becomes a challenge in modelling DC-AC inverter with constant output voltage. The design consists of a boost converter, h-bridge switching and driver, and LC filter to generate sinusoidal ac voltage as output to load.

How a solar powered voltage controlled boost converter works?

The converter operation is analyzed under open loop condition coupled with solar cell, it exhibits poor voltage regulation and hence, this converter is provided with closed loop control for output voltage regulation. The results obtained from the analysis in Matlab Simulink is tabulated. Fig.1: Solar powered voltage controlled boost converter.

How to maintain the output voltage of a boost converter?

A simple PI controller is used to maintain the output voltage of boost converter constant. The performance of the proposed system is compared with solar powered boost converter without voltage controller. All the investigations are carried using MATLAB. The results obtained are presented.

What is a sinusoidal AC inverter design?

The design consists of a boost converter, h-bridge switching and driver, and LC filter to generate sinusoidal ac voltage as output to load. To ensure a constant inverter output voltage, the design equipped by a close loop PI controller based on voltage control mode. The design modelled and simulated by PSIM.

What is solar powered electricity generation?

Solar powered electricity generation relies on photovoltaic system. A photovoltaic system is a system which uses one or more solar panels to convert solar energy into electricity. PV cells are made of semiconductor materials, when light energy strikes the solar cell, electrons are knocked loose from the atoms in the semiconductor material.

How to model a photovoltaic device?

In real photovoltaic device must include the effects of series and parallel resistance of the PV. The model is obtained with the parameters of the I-V equation given by manufacturer datasheet such as open circuit voltage, short-circuit current, maximum output power and diode constant „a“ is to be guessed.

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