Abstract

This paper proposes modeling and simulation of photovoltaic model. Taking into account the temperature and sun’s irradiance, the PV array is modeled and its voltage current characteristics and the power and voltage characteristics are simulated. This enables the dynamics of PV system to be easily simulated and optimized. It is noticed that the output characteristics of a PV array are influenced by the environmental factors and the conversion efficiency is low. Therefore a maximum power tracking (MPPT) technique is needed to track the peak power to maximize the produced energy. The maximum power point in the power–voltage graph is identified by an algorithm called perturbation & observation (P&O) method or Hill climbing. This algorithm will identify the suitable duty ratio in which the DC/DC converter should be operated to maximize the power output. The results confirm that the photovoltaic array with proposed MPPT controller can operate in the maximum power point for the whole range of
assumed solar data (irradiance and temperature).

Reference

- Francisco M. González-Longatt, Model of Photovoltaic Module in Matlab™, CIBELEC 2005

Index Terms

Computer Science

Algorithms

Key words

Maximum power point tracking
photovoltaic
solar
P&O
Buck converter