

Manuscript ID : 00000-55872

International Journal of Mechanical Engineering and Technology

Volume 9, Issue 7, July 2018, Pages 1423-1438, Page Count - 16



Source ID : 00000002

## MODELING AND SIMULINK OF VOLTAGE-CURRENT CHARACTERISTIC CURVES AND OUTPUT POWER OF SERIES-PARALLEL CONNECTED MONOCRYSTALLINE SILICON PHOTOVOLTAIC MODULES

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### Abstract

Connecting photovoltaic (PV) modules in an array design may have many options of series-parallel configurations. Experimental tests were done for a 10x50W modules array with different configurations installed in Baghdad/Iraq. These tests were executed under the outdoor climate conditions of Al-Jaderyia/Baghdad city from November 2017 to March, 2018. The temperature of the module is hard to be fixed but it kept in small range as possible 30-35 °C. The solar radiation is selected to be 900W/m<sup>2</sup>. It is found that even when the number of modules is the same, the parallel connection had the largest measured maximum power output of 471.7W. A Matlab/Simulink model was developed to simulate the practical behavior of the studied configuration. Accuracy of the experimental results and the relative error (RE) is determined between the Simulink model and the PROVA200 solar module analyzer output results. Relative error was in range between 1.44~5.4% for short circuit currents, open circuit voltages, and maximum powers.

### Author Keywords

Solar Cell, Photovoltaic Parameters, PV Array, Series-Parallel Connections

ISSN Print: 0976-6340

Source Type: Journals

Publication Language: English

Abbreviated Journal Title: IJMET

Publisher Name: IAEME Publication

Major Subject: Physical Sciences

Subject area: Mechanical Engineering

ISSN Online: 0976-6359

Document Type: Journal Article

DOI: 10.34218/IJMET.9.7.2018.152

Access Type: Open Access

Resource Licence: CC BY-NC

Subject Area classification: Engineering and Technology

Source: SCOPEDATABASE

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