

A Comparative Study of PV Models in Matlab/Simulink.

ABSTRACT

Solar energy has a major role in renewable energy resources. Solar Cell as a basement of solar system has attracted lots of research. To conduct a study about solar energy system, an authenticated model is required. Diode base PV models are widely used by researchers. These models are classified based on the number of diodes used in them. Single and two-diode models are well studied. Single-diode models may have two, three or four elements. In this study, these solar cell models are examined and the simulation results are compared to each other. All PV models are re-designed in the Matlab/Simulink software and they examined by certain test conditions and parameters. This paper provides comparative studies of these models and it tries to compare the simulation results with manufacturer's data sheet to investigate model validity and accuracy. The results show a four- element single-diode model is accurate and has moderate complexity in contrast to the two-diode model with higher complexity and accuracy.

Keyword: Fill Factor (FF); Matlab/Simulink; Maximum Power Point (MPP); Maximum Power Point Tracker (MPPT); Photo Voltaic (PV); Solar cell; Standard Test Condition (STC)