

Cut-off solar charge controller as an alternative towards system efficiency optimization

ABSTRACT

Based on the concept of optimizing the efficiency of the automated solar system in residential buildings application, this paper proposed a High efficiency solar Cut-Off charge controller as an alternative to the main solar charge controller in most conventional buildings solar system, the idea is to design an electronic circuit with low losses as a compared with the conventional charge controller to be a part of the integrated and automated building solar system, the design has an algorithm based on some environment parameters like sun Irradiance and weather temperature, this algorithm seems to be inversely calculated because its start from the value of full charge battery voltage. A Simulink Matlab simulator is attempted in the simulation phase of this research. The main difference between the method used in the proposed Cut-Off controller and other technique used in the past is that PV array output power is used directly through a bypass MOSFET to charge the battery bank when the voltage of the battery bank at lower level that its maximum while switching on another path when the batteries reaches its full charge value through another MOSFET to transfer this surplus power to what is called as an Auxiliary load ,fans or auxiliary battery used for system ventilation or solar tracking to reduce the ambient temperature for the system components, so adding more improvements on system performance, this would reduce the complexity of the system on one hand and produce a competitive efficiency, low cost and can be easily modified on the other hand.

Keyword: Component; PV solar analysis; Solar cell parameters; Battery charge controller; Power electronics; MPPT