DESIGN OF A PULSE WIDTH MODULATION (PWM) OR STANDARD CHARGE CONTROLLER FOR A PHOTOVOLTAIC SYSTEM IN AWKA, NIGERIA

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ABSTRACT

This paper proposes the design of a low cost pulse width modulation (PWM) charge controller for a standalone PV lighting system in Awka, Anambra State, Nigeria with a microcontroller to control and coordinate the functions properly. The charge controller was designed to protect the battery from both the solar panel and the LED lamps. The charging current was controlled by the PWM circuit. Moreover, battery can be disconnected from solar cells when over-charged and reconnected while discharging. The LED lamps which are the loads can be disconnected according to the excess current and under flow current limit for both battery and PV. The PWM charge controller should be equipped with LEDs to display the battery charging/discharging status, charge level and short circuit condition by the aid of the microcontroller. The LED lamps make it possible for our standalone PV system to operate on direct current (dc) all through from solar panels to battery to output light source.

Keywords: Battery, charging, discharging, LED lamps, standalone solar PV system.