ABSTRACT

Basically, solar panels are devices that can convert heat energy from the sun into electrical energy. Thermal energy from the sun is in the form of light intensity and temperature on the surface of the solar panel, but the output from the solar panel is relatively small and the intensity on the solar panel can change according to natural conditions. It is necessary to have a tool that can produce optimal light intensity and temperature. *Maximum power point tracker* (MPPT) using a sepic converter is one of several alternatives to optimize power in solar panels.

By searching for power points using the algorithm *Perturb & Observe* (P&O), the value of the effect of voltage and power on the photovoltaic (PV) module will be obtained. *Differential Power Processing* (DPP) enables series PV systems to optimize power production by achieving the MPP of each element of the PV module series. MPPT sepic converter will be used to observe the output of power generated from the series circuit of PV modules differential. MPP tracking with local information shows the differential converter delivers up to 50% more energy for series circuit PV modules.

In the MPPT Sepic test on a differential power processing system with the P&O algorithm as a control of the photovoltaic series module, the values obtained with 3 different conditions with the same load value of 15Ω 20W on each converter, namely, on the condition of the solar panel without *partial shading* with output the total differential system is 36.95 V and 45.83 W, in the condition of the solar panel being affected by *partial shading* with the total output of the differential system being 31.4 V and 35.33 W, and in the condition that one of the solar panels is completely covered by *partial shading* with the total output of the differential system is 27.12 V and 28.14 W.

Keywords: Solar panel, MPPT, *perturb & observe* (P&O), sepic converter, DPP