

Adapting perturbation voltage in PV array with power point tracking and differential evolution

ABSTRACT

The power output of photovoltaic array may reduce as the photovoltaic panels' connection close to each other and lead to the occurrence of partial shading. Under partial shading condition, the unshaded modules of PV array receive solar irradiation at higher level, while the shaded module of PV array receives lower irradiation. Thus, multiple maximum power point also will occur under the partial shading condition. The proposed modelling in this paper is 4x4 PV array and tested two different conditions in partial shading condition (PSC) where there are random irradiance values that had been set. Therefore, this paper aim to model more than one PV array and the platform modelling for this paper is 4x4 PV array. Besides that, explore the conventional method which is Perturb and Observe (P&O) based MPPT controller in optimizing the efficiency of the PV array. Unfortunately, the conventional method only can trap the power at the local maximum power under partial shading conditions. Thus, the proposed algorithm that used to track the maximum power is differential evolution (DE) in order to improve the power output of the PV array. The simulation results shows the proposed DE able to track the global MPP.