

Maximum power point tracking of partially shaded photovoltaic arrays using particle swarm optimization

ABSTRACT

This paper presents the particle swarm optimization based maximum power point tracking (MPPT) approach for maximizing output power of photovoltaic (PV) array under partially shaded conditions (PSC). During PSC, the P-V characteristic becomes more complex with multiple maximum power points (MPP). Most of the conventional MPPT approaches will be trapped at the local MPP and hence limiting the maximum power generation. As such, the investigation on particle swarm optimization (PSO) based MPPT is carried out to maximize the PV generated power principally under PSC operation. The performances of conventional MPPT approach and the proposed PSO-MPPT are investigated particularly on the transient and steady state responses under various shaded conditions. The simulation results show that the PSO-MPPT is able to facilitate the PV array to reach the global MPP as well as to assist the PV array to produce more stable output power compared to the conventional perturb and observe (P&O) algorithm.