

Performance evaluation of photovoltaic arrays subject to a Line-Ground fault

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Abstract : In this work, the effect of Line-to-Ground fault on the performance of photovoltaic (PV) arrays is analyzed. Due to the nature of their outdoor operation, PV arrays are subject to extreme weather conditions that affect their normal operation. The exposure of cables and junction boxes to such environmental conditions leads to different types of connection faults. Given that the frame of the PV panel is metallic, a short-circuit between the Line (positive charged wire) and the ground may occur frequently. A particle swarm optimization (PSO) based maximum power point tracking (MPPT) algorithm is then used to improve the efficiency of PV arrays. Simulation results show the large power loss caused by such type of fault and the effectiveness of the proposed approach in increasing the system's efficiency.

Keywords : Photovoltaic (PV) arrays, Line-Ground fault, Particle Swarm Optimization (PSO), Maximum Power Point Tracking (MPPT)