

Evaluation of MPPT Algorithms for Photovoltaic Generator by Comparing Incremental Conductance Method, Perturbation and Observation Method and the Method Using Fuzzy Logic

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Abstract : In the era of sustainable development, photovoltaic (PV) technology has shown significant potential as a renewable energy source. Photovoltaic generators (GPV) have a non-linear current-voltage characteristic, with a maximum power point (MPP) characterized by an optimal voltage, and depends on environmental factors such as temperature and irradiation. To extract each time the maximum power available at the terminals of the GPV and transfer it to the load, an adaptation stage is used, consisting of a boost chopper controlled by a maximum power point tracking technique (MPPT) through a stage of pulse width modulation (PWM). Our choice has focused on three techniques which are: the perturbation and observation method (P&O), the incremental conductance method (InCond) and the last is that of control using the fuzzy logic. The implementation and simulation of the system (photovoltaic generator, chopper boost, PWM and MPPT techniques) are then performed in the Matlab/Simulink environment.

Keywords : photovoltaic generator, technique MPPT, boost chopper, PWM, fuzzy logic, P&O, InCond

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