

A Comparative Study of the Maximum Power Point Tracking Methods for PV Systems Using Boost Converter

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Abstract : The studies on the photovoltaic system are extensively increasing because of a large, secure, essentially exhaustible and broadly available resource as a future energy supply. However, the output power induced in the photovoltaic modules is influenced by an intensity of solar cell radiation, temperature of the solar cells and so on. Therefore, to maximize the efficiency of the photovoltaic system, it is necessary to track the maximum power point of the PV array, for this Maximum Power Point Tracking (MPPT) technique is used. These algorithms are based on the Perturb-Observe, Conductance-Increment and the Fuzzy Logic methods. These techniques vary in many aspects as: simplicity, convergence speed, digital or analogical implementation, sensors required, cost, range of effectiveness, and in other aspects. This paper presents a comparative study of three widely-adopted MPPT algorithms; their performance is evaluated on the energy point of view, by using the simulation tool Simulink®, considering different solar irradiance variations. MPPT using fuzzy logic shows superior performance and more reliable control to the other methods for this application.

Keywords : photovoltaic system, MPPT, perturb and observe (P&O), incremental conductance (INC), Fuzzy Logic (FLC)

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