Grid connected pv system with battery storage

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Likewise, for the same reasons, several works have studied and developed an improved version of HC called IC, which can extract the MPP even in the case of different and rapid operating conditions, with fast convergence. Authors in [13, 14, 16, 17] have confirmed that the difficulty of the implementation and the high cost are the main disadvantages of the IC algorithm compared to P& O.

Currently, the efficiency and the excellent performance of the maximum power point tracking (MPPT) approaches based on artificial intelligence such as genetic algorithms (GA), artificial neural network (ANN), and fuzzy logic (FL) have attracted the attention of researchers. A. Alice Hepzibah in [14] has argued that these algorithms are more stable and ensure a quick response time for all irradiance levels.

The PV panel consists of multiple modules connected in series or parallel to increase the voltage level or current level, respectively. Figure 2 shows the PV cell equivalent circuit composed of a current source, two resistances (series and shunt), and an antiparallel diode.

The inverter which is the adaptation stage, gives us the possibility to convert DC-voltage into AC-voltage with desired frequency and amplitude. We notice that the inverter control allows to ensure a better quality of the currents and powers (P, Q) injected into the grid. The relationship between the input/output inverter voltages is given by [29]:

The FL-MPPT consists of three blocks: fuzzification, inference system, and defuzzification. Figure 5 shows the structure of FL-MPPT algorithm. The power variation ?P and voltage variation ?v are used as input variables of the fuzzy inference system and ?D as the output. The relation between these variables is defined based on fuzzy set theory. The fuzzy system inputs and output are given by:

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