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Hybrid MPPT Technique Using Fuzzy Logic and Ant Colony for Effective Solar Pumping Head

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Abstract : Solar cells convert energy from sun directly into electricity. Solar photovoltaic modules are where the electricity gets generated, but are only one of the many parts in a complete photovoltaic (PV) system. For the generated electricity to be useful in a home or business, several other technologies must be in place. The non-linear nature of IV curve of the PV system makes it necessary to use some technique to track the maximum voltage and maximum current point on IV curve corresponding to Maximum Power Point(MPP). Thus, Maximum Power Point Tracking (MPPT) techniques are widely used for this purpose. Currently there are many MPPT algorithms in use but they have some problems. For example, perturb and observe (P & O) method will cause oscillations around the maximum power point. It is perceived that the use of two MPPT algorithms in pair will help to overcome the drawbacks of individual MPPT algorithms used in isolation. This paper proposes two MPPT algorithms, such as Fuzzy logic and Ant colony technique to overcome the inherited deficiencies found in P&O technique. Even under the frequent changing irradiance conditions, the proposed MPPT technique is much more robust in tracking the MPP and is less oscillatory around the MPP as compared to P&O.

Keywords : Photovoltac(PV) cell, Maximum Power Point Tracking (MPPT), Perturb and observe (P&O) Fuzzy Logic, Ant Colony, Hybrid Algorithm.

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