Presentation of a Maximum Power Point Tracking (MPPT) Method Based on Artificial Neural Network for Rapidly Variable Shading Conditions in Photovoltaic Systems

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Abstract The aim of this thesis is the presentation of a new method for the maximum power point tracking as a two-stage method to extract maximum power a photovoltaic array under different levels of irradiance and temperature (conditions of the penumbra). Temperature changes and irradiance will create several local maximums on P_I arrey curve. This method finds global maximum power point under these conditions. Therefore The local maximums that one-stage methods are caught there, excluded. The first phase of the proposed method, finds the point to abandon local maximum power point and arrey operating point to the maximum power point are close. The second phase is one of the most common methods of maximum power point tracking that finds the global maximum and it puts as arrey operating point. Actually, This thesis presents a method of maximum power point tracking based on neural network that we can accurately track the maximum power point under conditions of the penumbra to minimize oscillation around the maximum power point which this act will reduce system losses and increase system efficiency. The system consists of two series arrays, load (battery), DC / DC converter and the proposed method that is simulationed in the MATLAB / SIMULINK software.

Keywords : Key words: Solar cell, Photovoltaic system, Maximum Power Point Tracking, Neural Network