A Fuzzy Logic Control Method for MPPT of PV Systems

ABSTRACT:
Maximum power point trackers are so important in photovoltaic systems to increase their efficiency. Many methods have been proposed to achieve the maximum power that the PV modules are capable of producing under different weather conditions. This paper proposed an intelligent method for maximum power point tracking based on fuzzy logic controller. The system consists of a photovoltaic solar module connected to a DC-DC Buck-boost converter. The system has been experienced under disturbance in the photovoltaic temperature and irradiation level. The simulation results show that the proposed maximum power tracker could track the maximum power accurately and successfully in all condition tested. Comparison of different performance parameters such as: tracking efficiency and response time of the system shows that the proposed method gives higher efficiency and better performance than the conventional perturbation and observation method.

SOFTWARE: MATLAB/SIMULINK
CIRCUIT DIAGRAM:

Fig. 1: System used for simulation.
EXPECTED SIMULATION RESULTS:

Fig. 2: case 1: changing the solar radiation

Fig. 3: Case 1: performance of FLC method

For Simulation Results of the project Contact Us

Gmail: asokatechnologies@gmail.com, Website: http://www.asokatechnologies.in
0-9347143789/9949240245
Fig. 4: Case 1: performance of P&O method

Fig. 5: Case 2: changing the solar radiation

For Simulation Results of the project Contact Us

Gmail: asokatechnologies@gmail.com, Website: http://www.asokatechnologies.in
0-9347143789/9949240245
Fig. 6: Case 2: performance of FLC method

Fig. 7: Case 2: performance of P&O method

For Simulation Results of the project Contact Us

Gmail: asokatechnologies@gmail.com, Website: http://www.asokatechnologies.in
0-9347143789/9949240245
Fig. 8: Changing the temperature

Fig. 9: Performance of FLC method

For Simulation Results of the project Contact Us

Gmail: asokatechnologies@gmail.com, Website: http://www.asokatechnologies.in
0-9347143789/9949240245
CONCLUSION:

Photovoltaic model using Matlab/SIMULINK and design of appropriate DC-DC buck-boost converter with a maximum power point tracking facility are presented in this paper. A new method for MPPT based fuzzy logic controller is presented and compared with the conventional P&O MPPT method. The models are tested under disturbance in both solar radiation and photovoltaic temperature. Simulation results show that the proposed method effectively tracks the maximum power point under different ambient conditions. The oscillation around MPP is decreased and the response is faster in compared with the conventional methods. Comparing the tracking efficiency of both methods indicates that the proposed method has a higher efficiency than the conventional P&O MPPT method.
REFERENCES:


