Abstract

In this paper, maximum power point tracking of solar panel using artificial neural network control is developed and simulated in Mat lab. The Solar panel is modeled using conventional five parameter model and adjusted according to the manufacturer's datasheet values by calculating its internal resistance using an iterative process, Newton-Raphson method. A simple DC-DC Boost converter is used to transfer the maximum power to the load which is achieved by using a control strategy that changes the duty cycle of this converter accordingly. Artificial Neural Network is used to generate the reference values, according to the changing atmospheric conditions, that are required for the control strategy. Training of the neural network is done using the Mat lab tool box using feed forward back propagation training algorithm and mean square error algorithm is used for calculating the error. The proposed model is compared with conventional Perturb and Observe technique and shown that method using ANN gives better results.

References

- J. A. Gow and C. Manning, "Development of a photovoltaic array model for use in
power electronics simulation studies,&quot; in proc. IEE Electric power applications, vol 146, issue 2, pp. 193-200, March 1999.
- Femia, N. ; Petrone, G. ; Spagnuolo, G. ; Vitelli, M. ; , &quot;Optimization of perturb and observe maximum power point tracking method,&quot; IEEE Transactions on Power Electronics, vol. 20, no. 4, pp. 963- 973, July 2005
- Anil K et al. &quot;Simulation model of ANN based maximum power point tracking controller for solar PV system. &quot; Solar Energy Materials and Solar Cells 95. 2 (2011), pp. 773-778.

Index Terms

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Artificial Neural Network (ANN)  solar panel  Maximum Power Point Tracking (MPPT)