



Artificial Intelligence Techniques for Controlling PV- Wind Powered Rural Zone in Egypt

H. M. Fargli¹, F. H. Fahmy¹, and M.A. H.EL-Sayed²

¹Electronics Research Institute
National Research Center Building
Cairo, Egypt

Phone number:+202 33310512, e-mail: farghally555 @yahoo.com

²Center of Energy Studies, University of Trinidad and Tobago

Abstract. In remote areas, electricity could still be available if stand-alone renewable electricity power sources are used. One of the most promising applications of renewable energy technology is the installation of hybrid energy systems, where the cost of grid extension is prohibitive and the price of fuel increases drastically with the remoteness of the location. It has been demonstrated that hybrid energy systems can significantly reduce the total life cycle cost of stand-alone power supply, while at the same time providing a more reliable supply of electricity. Due to the high nonlinearity characterizing the PV-Wind hybrid system it would be impractical to develop rigorous mathematical model and at the same time obtain a simple and effective controller.

In this paper, a control system, which includes either the Neural Network Controller (NNC) or the Fuzzy Logic Controller (FLC) is developed for achieving the coordination between the components of a PV-Wind hybrid system as well as control the energy flows. The performance of the system is evaluated by comparing the performance of the system using the NNC and the FLC. Also, this work presents a complete mathematical modeling and MATLAB simulink model for the different components of the hybrid system.

Key words

Hybrid system, photovoltaic system, wind system, battery bank. Neural controller, fuzzy logic controller.

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