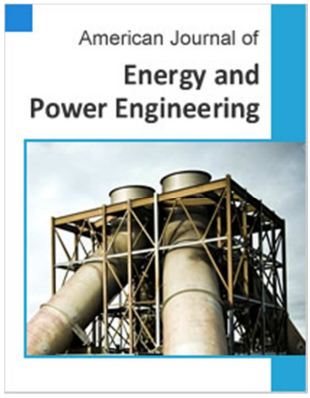
American Journal of Energy and Power Engineering
2017; 4(6): 39-43
http://www.aascit.org/journal/ajepe
ISSN: 2375-3897

AASCIT American Association for Science and Technology



Keywords
Electrical Generation System,
Efficiency,
FFNN

Received: September 21, 2017
Accepted: October 13, 2017
Published: October 25, 2017

High Reliability of Electrical Generation System to Enhance the Efficiency by Using the Algorithm of Feed Forward Neural Networks

Hassan Farhan Rashag*, Mohammed H. Ali

Electronics Technical Department, Technical Institute of Babylon, Al-Furat Al-Awsat Technical University, Babylon City, Iraq

Email address

hassan_rashag@yahoo.com (H. F. Rashag), mdever65@yahoo.com (M. H. Ali)

*Corresponding author

Citation

Hassan Farhan Rashag, Mohammed H. Ali. High Reliability of Electrical Generation System to Enhance the Efficiency by Using the Algorithm of Feed Forward Neural Networks. *American Journal of Energy and Power Engineering.* Vol. 4, No. 6, 2017, pp. 39-43.

Abstract

The electrical generation system is used to generate electrical power based on turbine and governor. however, the main problem of this classical electrical generation is that the distortion in the terminal voltage and frequency deviation in the load. To overcome this problem, new approach of Feed forward neural network FFNN is used to optimize the performance of system as results to enhance the efficiency of whole system. The simulation results showed that the system based on FFNN is high reliability and more effectiveness as compared with traditional system.

1. Introduction

The electrical generation system is widely used to generate high electrical voltage. In addition, the classical generation system causes high overshoot and undershoot for current with high oscillation for frequency especially at the starting of load. Therefore, many authors proposed a lot of method to enhance the performance of system based on fuzzy logic system [1] [2] [3]. Fuzzy inference system is used instead of PID controller to enhance voltage [4] [5]. In addition, intelligent techniques us applied on automatic voltage regulator frequency system to improve the efficiency of system and to minimize the losses [6] [7].

In this paper, new approach is used to increase the efficiency of electrical system via FFNN.

2. The Proposed Method Based on Feed Forward Neural Network

In this proposed method, Simulink matlab is used to build the system using toolbox. The FFNN is used to optimize frequency deviation and to minimize the distortion of electrical current. Figure 1 shows the specification of proposed FFNN.

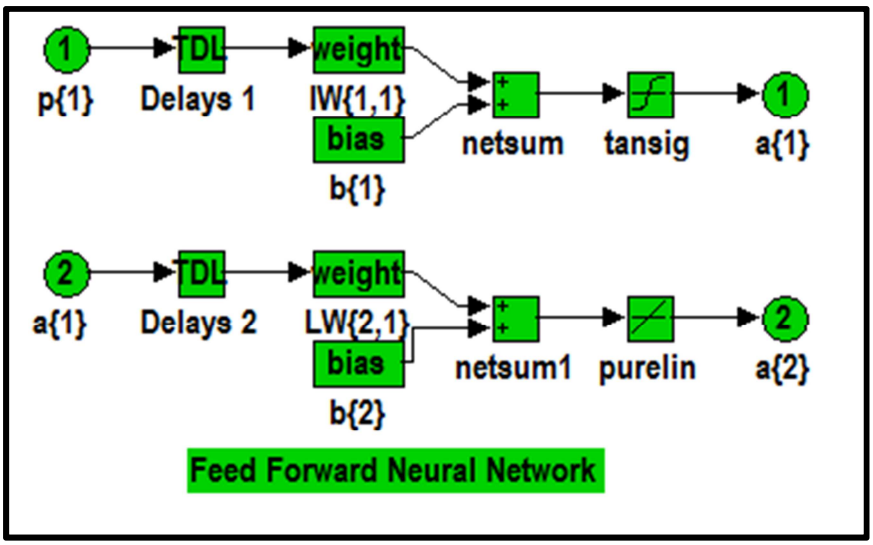


Figure 1. *Proposed FFNN.*

The regression system for the training, validation, and testing is shown in figure 2

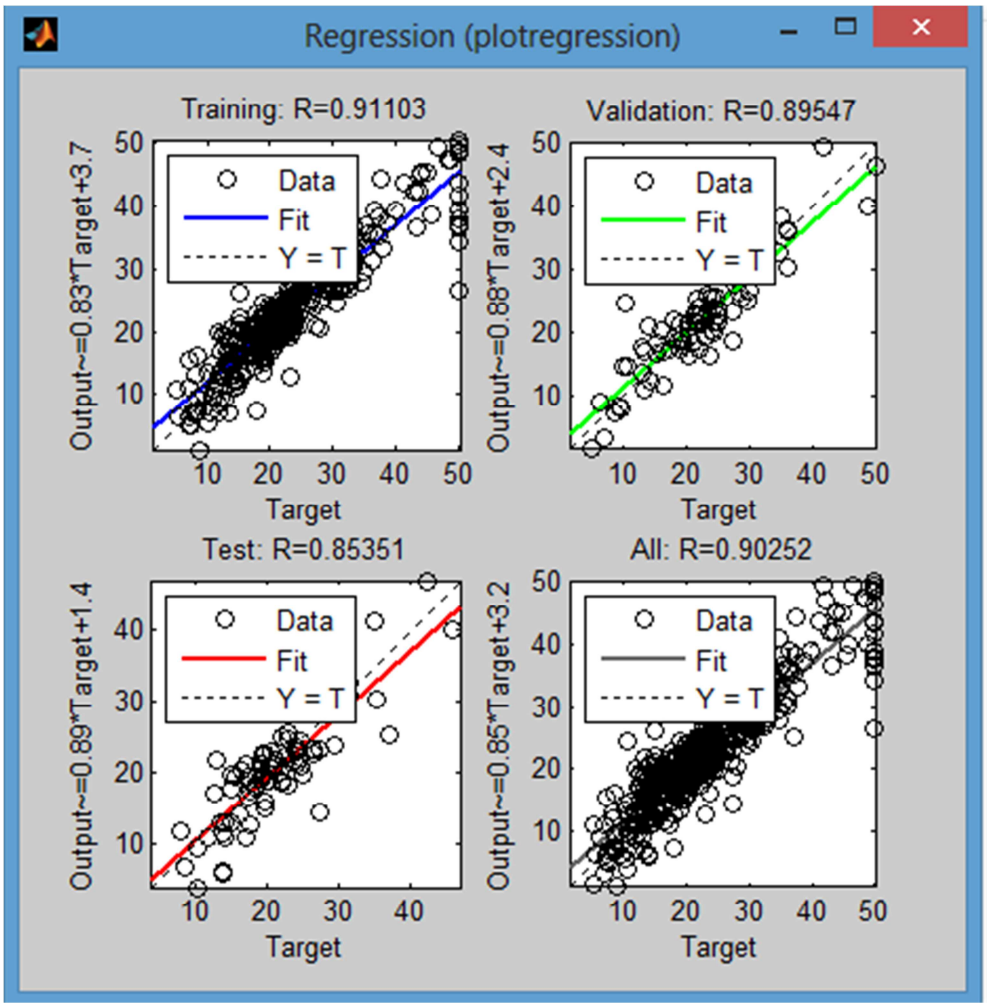


Figure 2. *Regression system.*

The performance of whole system with training state and FFNN training circuit are showm in figures 3, 4, 5 respectively.

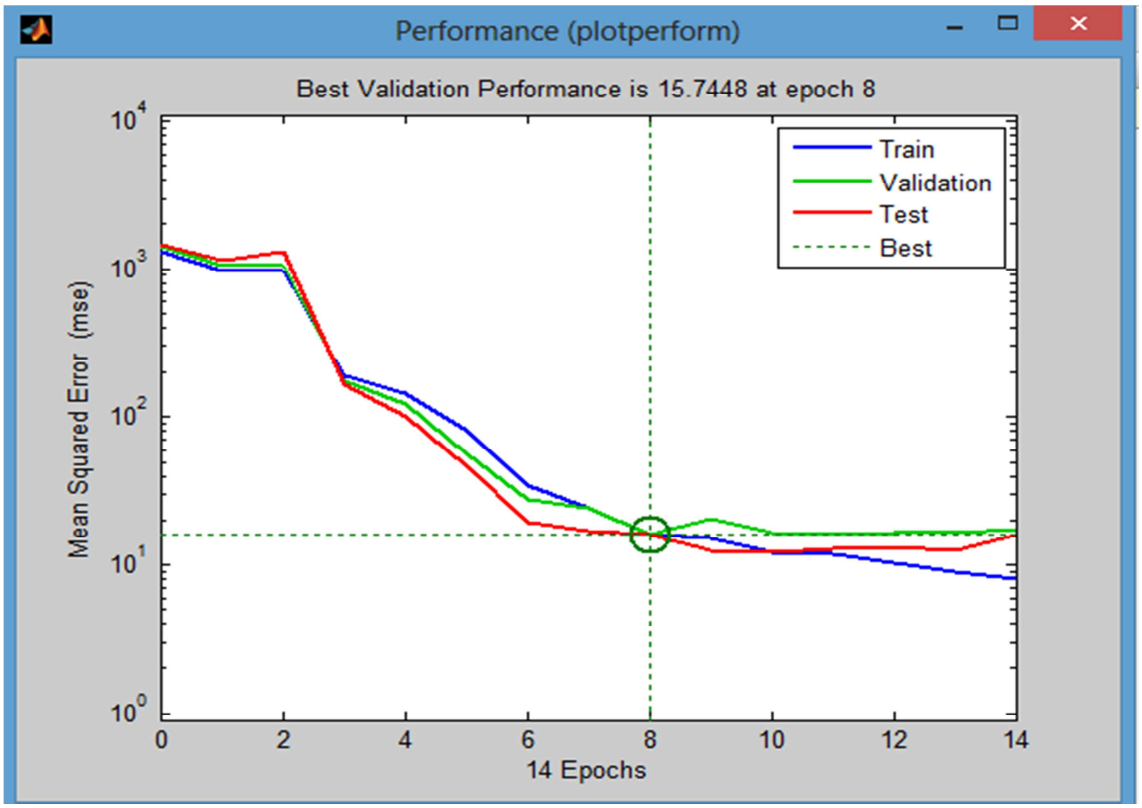


Figure 3. *Performance of FFNN.*

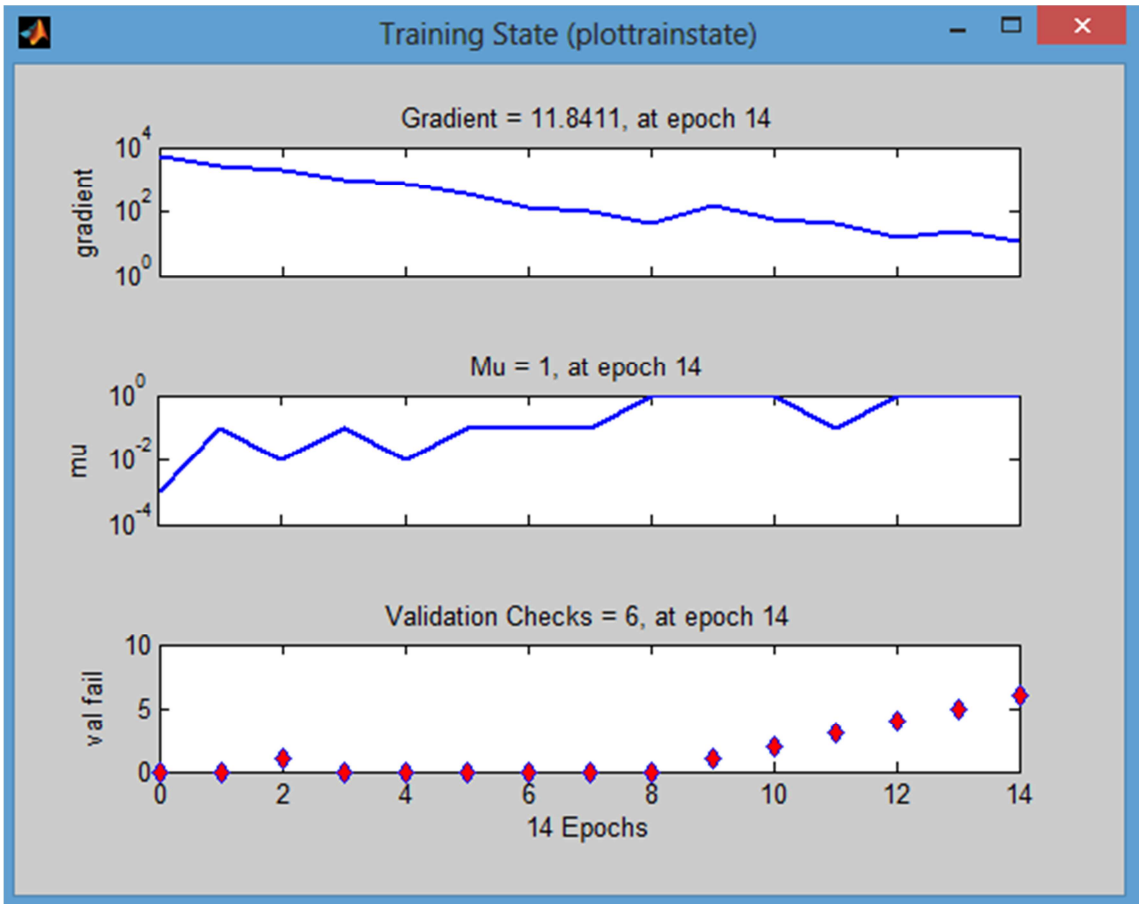


Figure 4. *Training state of system.*

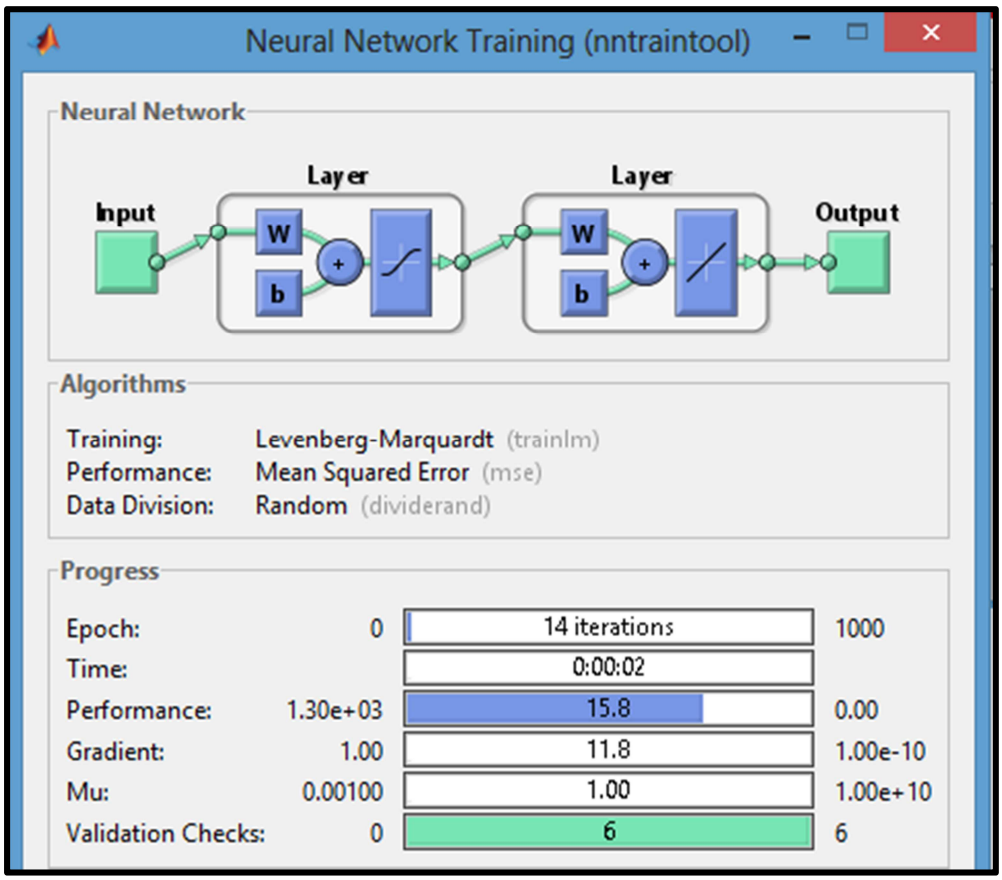


Figure 5. *Simulink of FFNN with training.*

3. Simulation Results and Discussion

From figure 6, it can be seen that, the behaviour of current under sudden load in the proposed FFNN is more smooth and free of distortion as compared with traditional method. Figure 7 shows that the efficiency with FFNN is almost 90 percentage while the efficiency in the classical system 60 percentage.

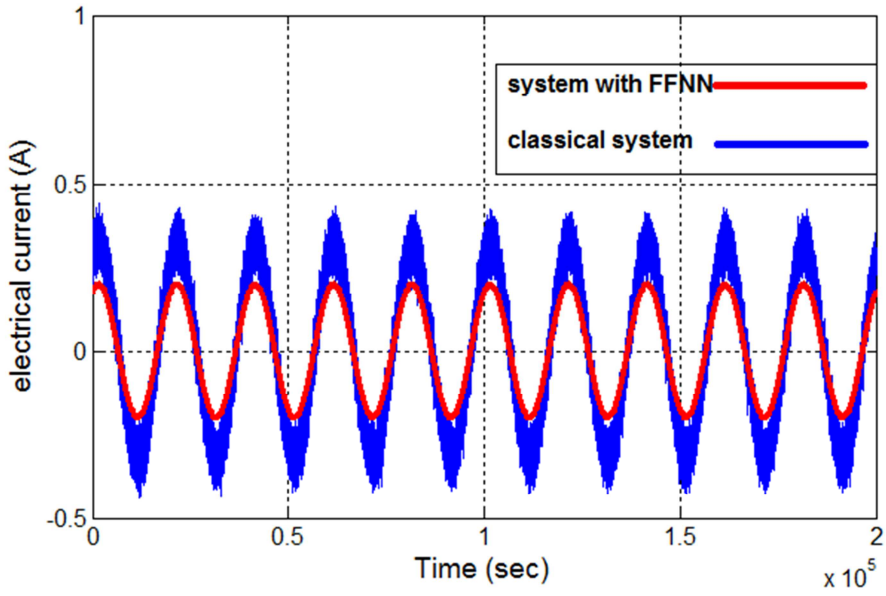


Figure 6. *Compared the electrical current.*

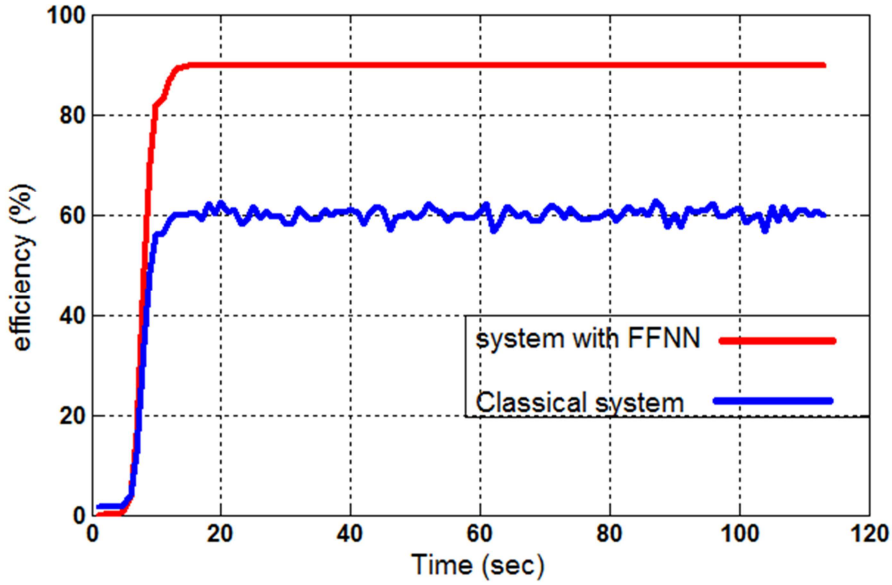


Figure 7. *Compared the efficiency of system.*

4. Conclusion

The electrical system with FFNN is high accuracy, robustness and good tracking with the reference. In contrast, the system with traditional method has low efficiency and high distortion for current and frequency. Furthermore, FFNN is used in this paper to remove the problem of classical system. Finally, the electrical system is enhanced by using intelligent technique based on Feed forward neural network.

References

[1] H. L. Demiroren. "the application of artificial neural network technique for AGC" Electric power and energy system" vol. 24. 2002. Pp: 345-354.

[2] H. D. Mathur." frequency stabilization using fuzzy logic for multi area power system". The south pacific journal of natural science. Vol. 4 2007. Pp: 22-30.

[3] Zwee. Lee. "a particle swarm optimization approach for optimum design of PID controller in AVR" IEEE Transaction on energy conversion. Vol. 19. no. 2. pp: 384-392. 2004.

[4] S. Patandi. Design fabrication and parametersevaluation of a surface mounted pmsm. IEEE international conference on power electronics, 2014.

[5] N. B. ulvestad v. kragset. Long step start up simulation for pmsm. 15th international IGTE. 2012.

[6] D, saban. Permanent magnet synchronous machine for subsea application. Technical papers page 1-8 2008.

[7] E, Thibaut. Use of liquid filled motor for pump application. In pcic Europe conference record page 1-8 2010.