CHAPTER 6
CONCLUSION AND RECOMMENDATION

6.1   Conclusion

This thesis has been proposed artificial neural network model for allocate reactive power. The thesis considers two cases which are five buses sample system and 21- bus system in central I of Electricite Du Lao (EDL) in Lao PDR system or (EDL21-bus system). For five-bus system, input layer has 3 nodes which are reactive power from each load bus, output layer has 6 nodes which are reactive power from each generator to load bus and hidden layer has 20 nodes. For EDL21-bus system, input layer has 15 nodes which are reactive power from each load bus, output layer has 60 nodes which are reactive power from each generator to load bus and hidden layer has 60 nodes. The inputs of the learning process in neural network is using 2-day daily load curve and performing load flow analysis for 48 hours of load demand, for the target outputs have to be predetermined as the reference values of computed from Y-bus matrix of the training and learning processes. The outputs is using 2-day daily load curve and performing load flow analysis for 48 hours of load demand.

For testing performance of artificial neural network, the data 24 hours that have never been trained are used as input for testing. It can be observed that the developed, artificial neural network can allocate reactive power transfer between generators and load with very good accuracy.

The proposed artificial neural network can be trained with little difficulty, once the training data are generated. The accuracy of artificial neural network has been compared with allocating reactive powers by Y-bus matrix method. The simulation results have illustrated that artificial neural network is a good accuracy with simplicity in calculation. The trained ANN can provide solution in good manner. The allocating reactive power using artificial neural network has gotten all characteristics of the conventional Y-bus matrix method.

The result for allocate reactive power as obtained are provided based on MAPE. This study found that artificial neural network has small error, where is the error around 0.433 to 2.812 % for five-bus sample system and error around 0.00 to 12.82 % for EDL21-bus system

6.2 Recommendation

It is recommended for further study that similar neural network algorithm with different architectures and correlated factors that affect allocate reactive power. In other words, recurrent neural networks (RNNs) or feedback architectures may be used to pass the output backward through the net or between nodes in the same layer.

Data used for training the models are little or training period into short range is affected to the result, if are good model should be added the number of reactive power at load pattern more than this case for training model, because data of training have only 48 hours or two day in case study.

For analysis the performing load flow, the details of load demand should be included of hours, daily, weekly, monthly, yearly data respectively.

A further study can be extended to all sectors in Laos's electricity demand; it is an important factor of power system planning and development strategy in Lao PDR. In addition, Electricite Du Lao (EDL) should be optimal placement of reactive power all the systems.