**Lab 3 – Neural Network - MLP**

1. Study Section 4.4.4. Download the dataset PNOz.dat and run the MLP. See whether you can get something similar to Fig. 4.16.
2. Use the knowledge you gained from #1 to solve the following problem:

Suppose that the local power company wants to predict electricity demand for the next 5 days. They have the data about daily demand for the last 5 years. Typically, the demand will be a number between 80 and 400.

a. Describe how you could use an MLP to make the prediction. What parameters would you have to choose, and what do you think would be sensible values for them?

b. If the weather forecast for the next day, being the estimated temperatures for daytime and nighttime, was available, how would you add that into your system?

c. Do you think that this system would work well for predicting power consumption? Are there demands that it would not be able to predict?

1. Modify the code to allow another hidden layer to be used. You will have to work out the gradient as well in order to compute the weight updates for the extra layer of weights. Test this new network on the Pima Indian dataset that was described in Section 3.4.4.
2. A recurrent network has some of its outputs connected to its own inputs, so that the outputs at time *t* are fed back into the network at time *t* + 1. This can be a different way to deal with time-series data. Modify the MLP code so that it acts as a recurrent network, and test it out on the Palmerston North ozone data on the book website.