

TINONS1 EXERCISES WEEK 4

Exercise 1 :

Create a 1D data set in matlab with

```
x = linspace(-5, 5, 500);  
t = sinc(x) + 0.05*randn(1,500);
```

that is, a sinc-function with noise. The input is x and the output is t. Now try to use the multi-layer perceptron (similarly to the “ANNs.m”-file) to fit the data with e.g. 3 hidden units. The activation (output) function should now be ‘linear’ instead of logistic, since we try to perform regression instead of classification. Train the network on the 1D data set.

Plot the network diagram. Write out the full equation for the neural network output function with values from the trained network. Plot the output functions of each hidden unit. Plot the output function for the network and compare to the sinc-function.

Experiment with more hidden units.

Exercise 2 :

Experiment with the “ANNs.m”-file and the 2D, 2-class model.

Try to vary the different parameters in a systematic way - e.g. make a plot of the train/test classification errors as function of number of hidden units.

What is the meaning of the outputfunctions - ‘linear’, ‘logistic’ and ‘softmax’ ?

What is the form of the error/cost function ?

Which optimisation method do we use ?

Exercise 3 :

Apply the MLP on your own case.

How many (weight-)parameters does your model contain ?