

Homework 1 – due M 02/05/07

Getting used to Matlab Neural Network Toolbox neural networks

Submit important commands, plots, etc., for grading

1. [50 points]

Use information found in the Matlab help for Neural Network Toolbox, Reference, Functions Listed Alphabetically, newff.

- a) Use the desired curve as $P = [0 \ 1 \ 2 \ 3 \ 4 \ 5 \ 6 \ 7 \ 8 \ 9 \ 10]$; $T = [0 \ 1 \ 2 \ 3 \ 4 \ 3 \ 2 \ 1 \ 2 \ 3 \ 4]$ and plot via Matlab.
- b) Using newff make several feedforward networks to compare their performance. Use purelin at the (single neuron) output layer and tansig for all other layer activation functions. Compare and discuss the results of each of the cases.
 - b1) as listed in the newff information (2 layers, 5 input neurons and 1 output)
 - b2) two layers with 6 neurons in the first layer and 1 neuron in the second layer.
 - b3) two layers with 1 neuron in the first layer and 1 neuron in the second layer.
 - b4) five layers with 2, 3, 4, 5, 1 neurons in the respective layers.
 - b5) five layers with 5, 5, 5, 5, 1 neurons in the respective layers.

2. [50 points]

Use information found in the Matlab help for Neural Network Toolbox, Using the Neural Network Toolbox, Advanced Topics, Custom Networks.

- a) Create an m-file, called netC.m, for the Custom Network (of the Matlab help), call it netC, using the commands for forming and running the custom network (under Network Definition and Network Behavior). Include clarifying comments on important lines.
- b) Create a second m-file, netC2.m, for an identical custom network to netC except that the delays from the first input to the second layer are double those of netC. Compare the results using the same inputs as for netC.
- c) Create a third m-file, netC3.m, for an identical custom network to netC except that there is an added unit delay from the output of the third layer to the input of the second layer. Compare the results using the same inputs as for netC.