Experimental Results

October 16, 2018

1 Performance Analysis on the Effect of simulation fixed step size on the accuracy, architecture on neural network replacement of PID in dc motor speed control

1.1 Performance with 10 hidden neurons

Training Parameter: Tansig hidden layer, maximum epoch 150, stopping criteria epoch, minimum gradient, only the maximum epoch is changed everything else stays default. Such as input Delays = 1:2; feedback Delays = 1:2; hidden Layer Size = 10; With smaller step size, we have more data, and less error. Worst performance is shown in bold

Table 1: Effect of Fixed step size on Accuracy Testing - Hidden Neurons 10

Fixed Step Size	Training Error	Test Error
0.001	2.4116e-06	1.9052e-06
0.01	2.3287e-06	1.8463e-06
0.1	7.4570e-05	6.1457e-05
0.2	**2.8739e-04**	**3.4440e-04**

1.2 Performance with 3 hidden neurons

Table 2: Effect of Fixed step size on Accuracy Testing - Hidden Neurons 3

Fixed Step Size	Training Error	Test Error
0.001	2.5779e-06	2.0565e-06
0.01	2.5016e-06	1.9960e-06
0.1	9.5324e-05	7.7856e-05
0.2	**3.6994e-04**	**4.0580e-04**

From the experiment we can conclude that a fixed step size of 0.01 will give better performance and the minimum allowed number of neurons in the hidden

layer is 3.