

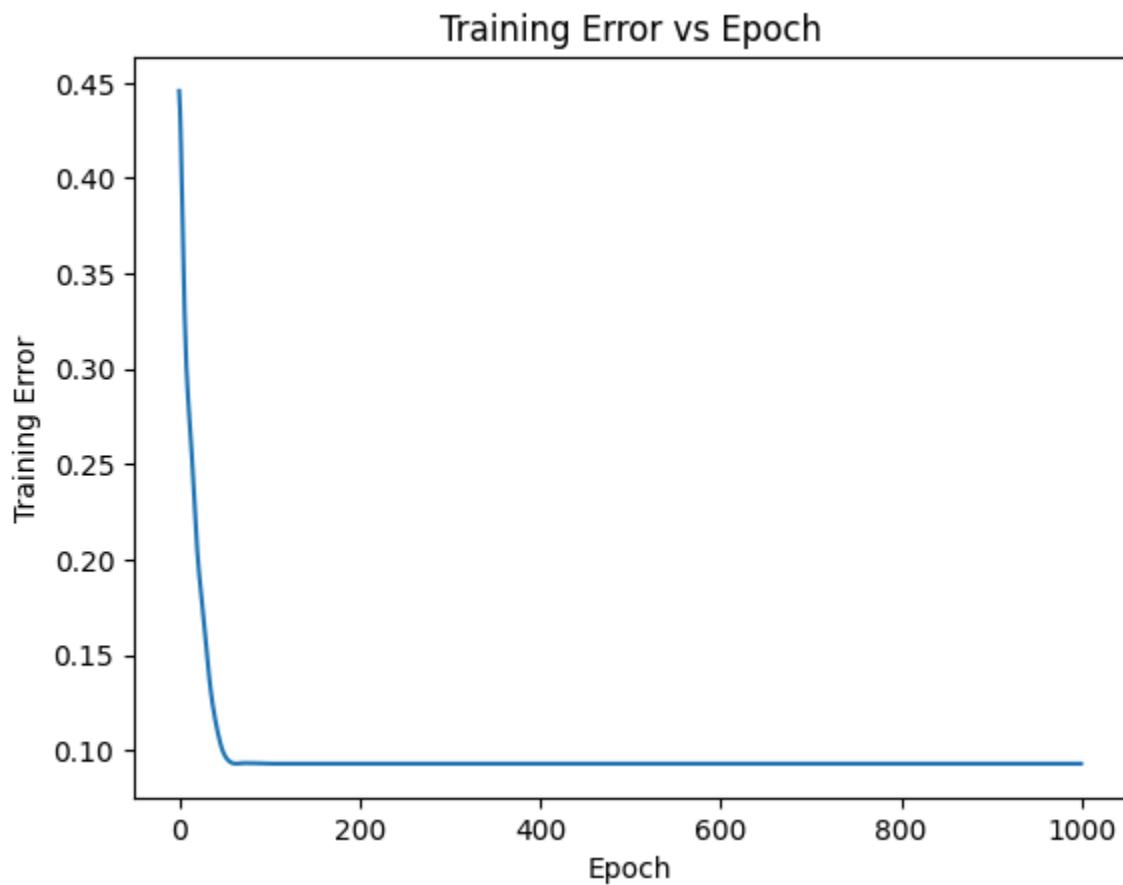
CS5691: PRML - Assignment 03

Group 20

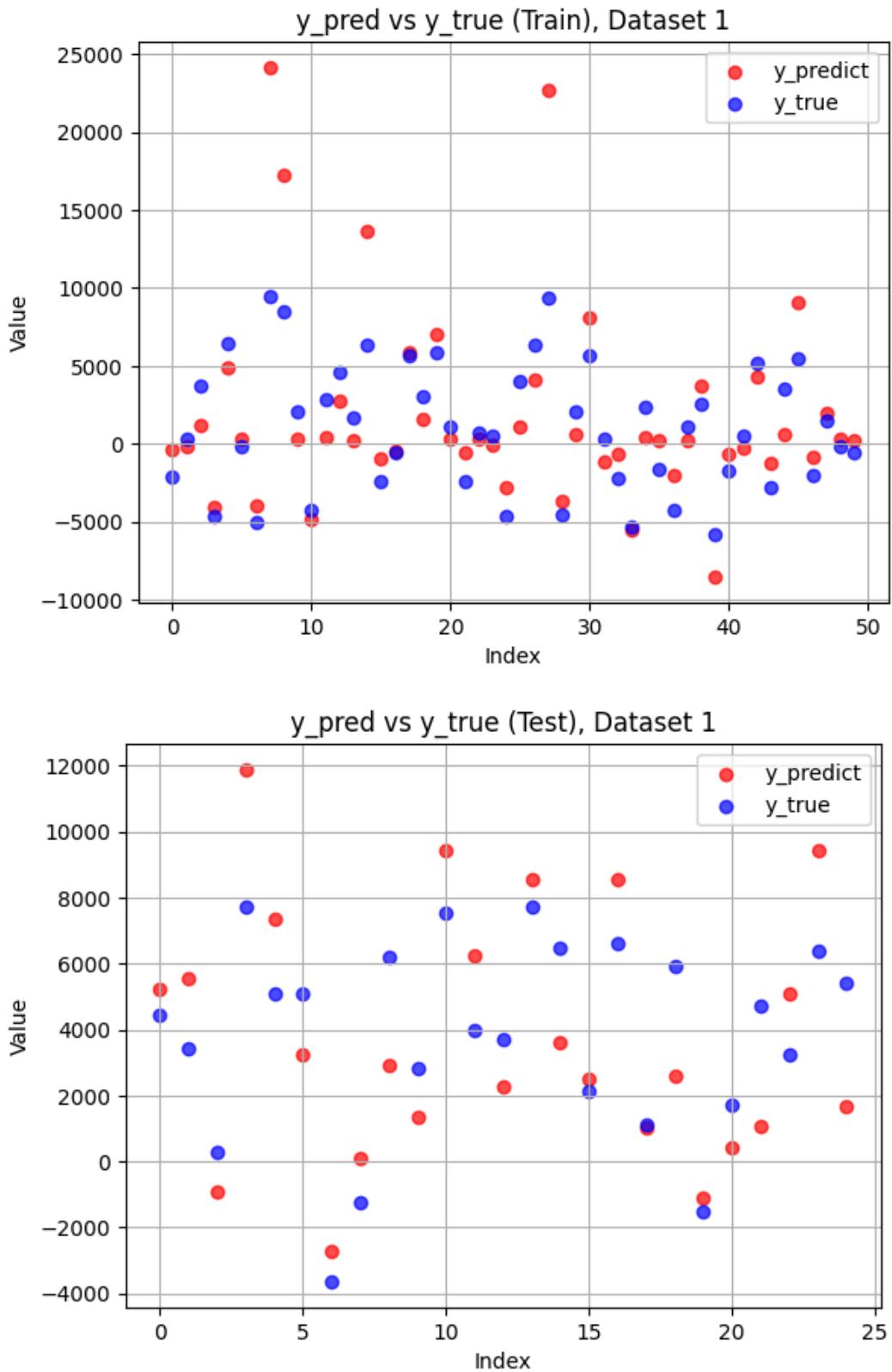
CS24M033 Pradeep Peter Murmu , GE24Z009 Naveen Seth Hanig

Dataset-1

Error vs Epoch Plot

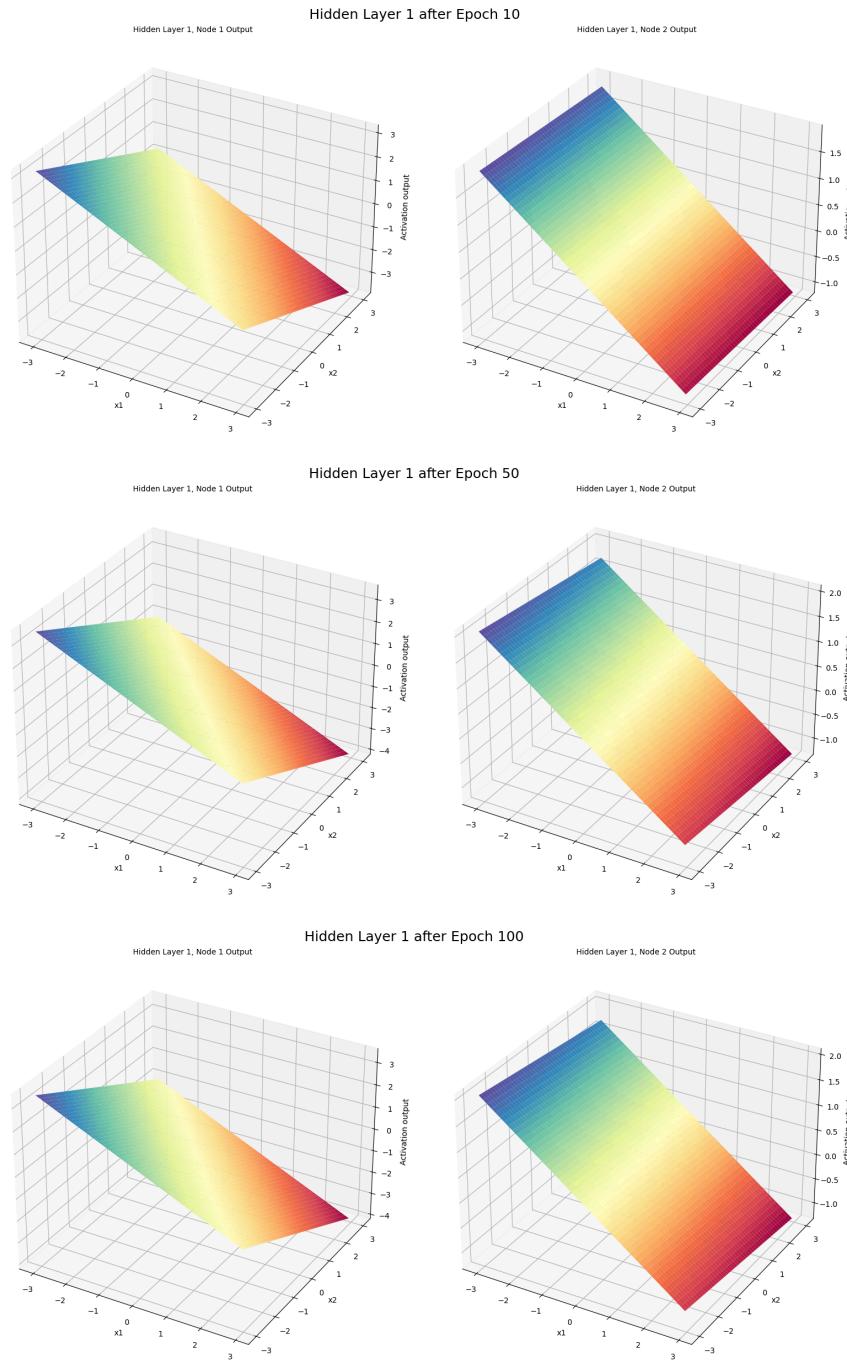


Scatterplots for Test- and Training-Data



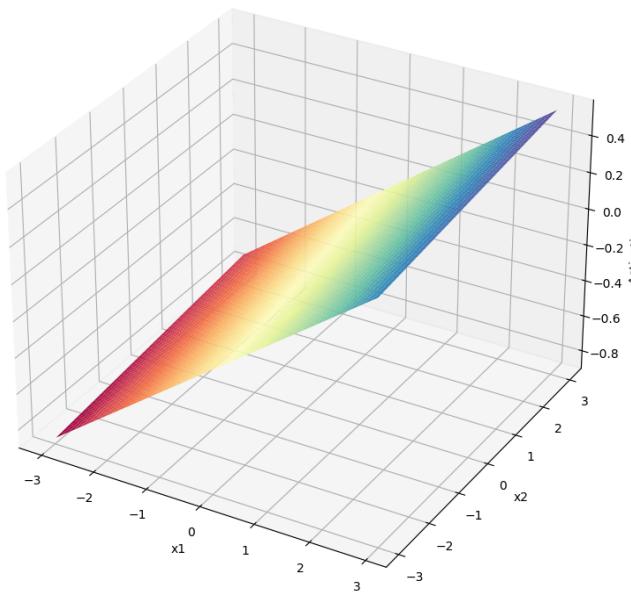
Surface Plots

The model converges before 100 layers.



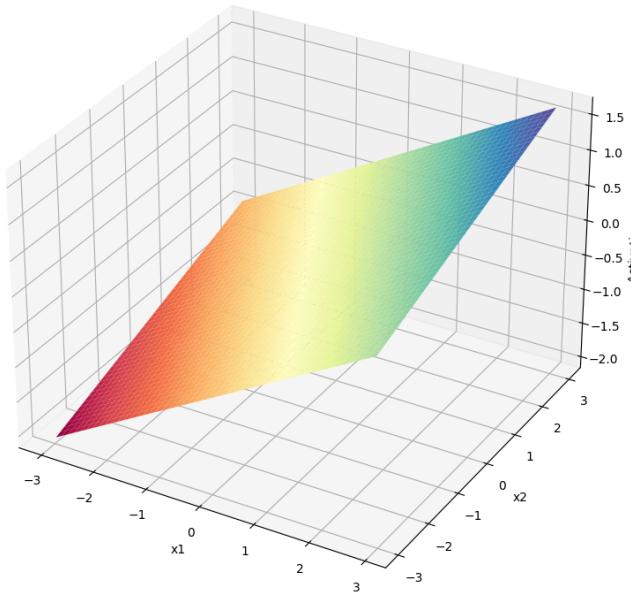
Output Layer after Epoch 1

Output Layer, Node 1 Output



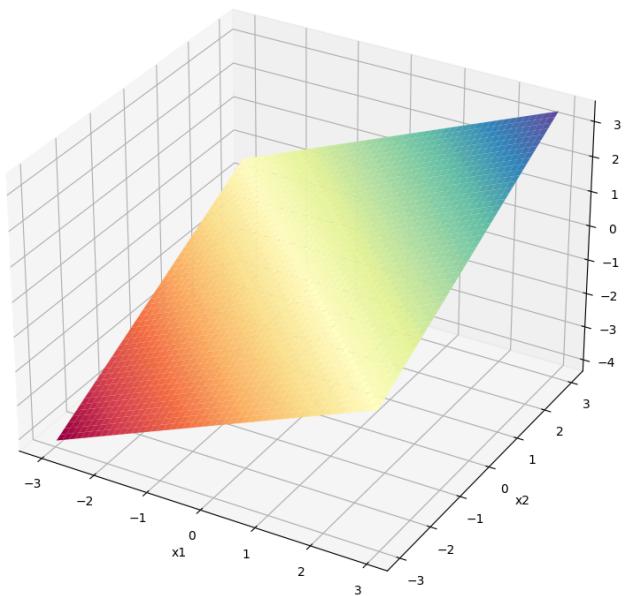
Output Layer after Epoch 10

Output Layer, Node 1 Output



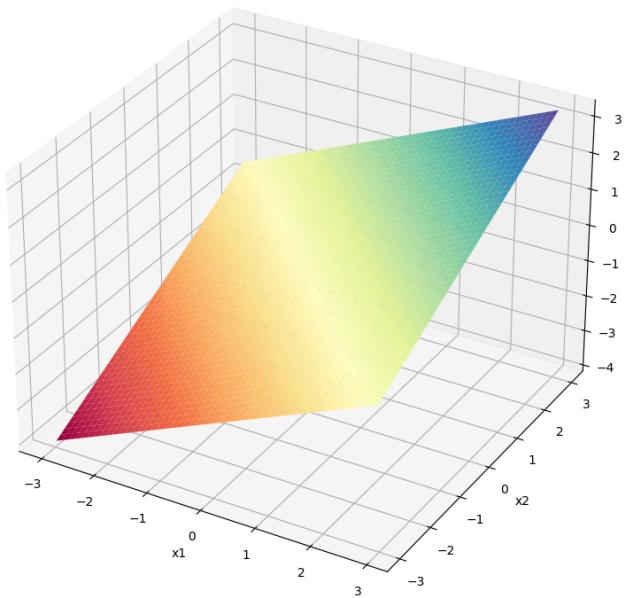
Output Layer after Epoch 50

Output Layer, Node 1 Output



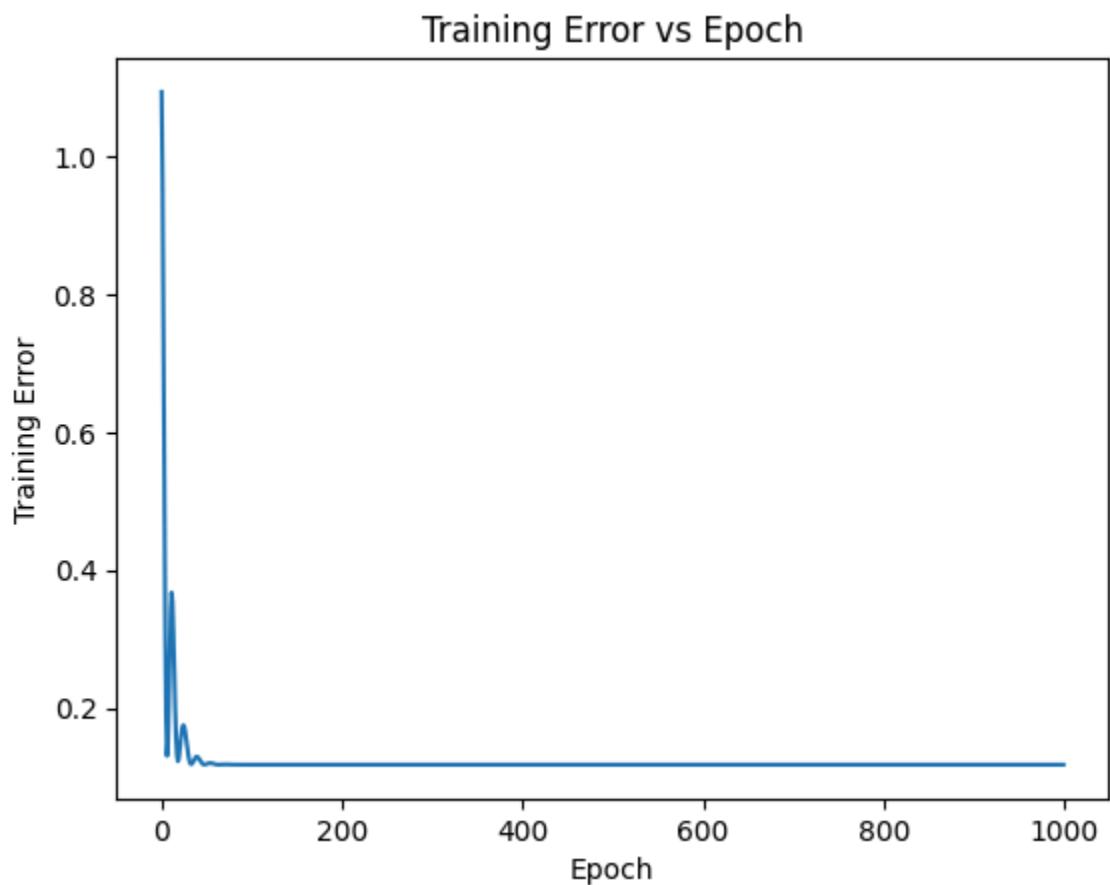
Output Layer after Epoch 100

Output Layer, Node 1 Output

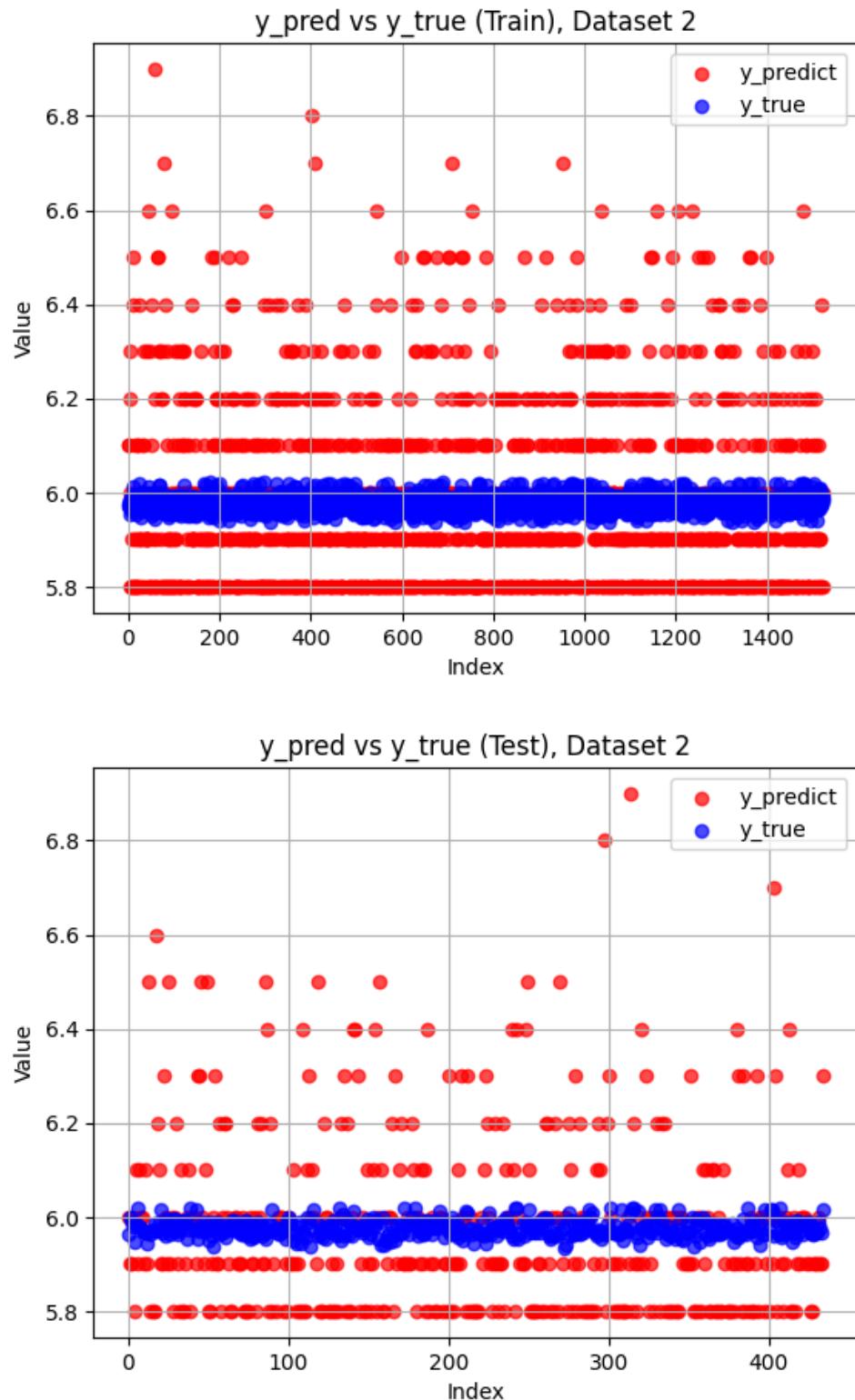


Dataset-2

Error vs Epoch Plot



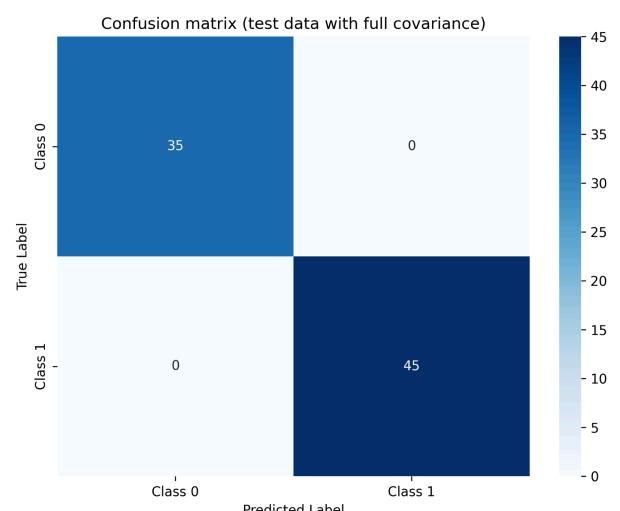
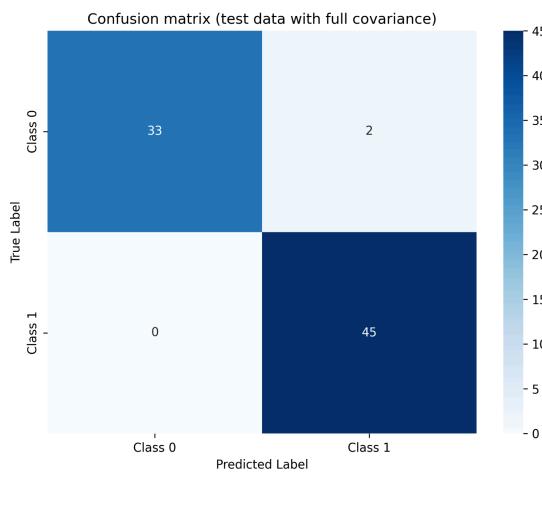
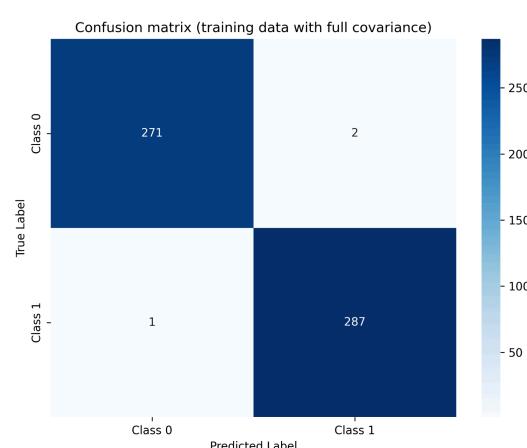
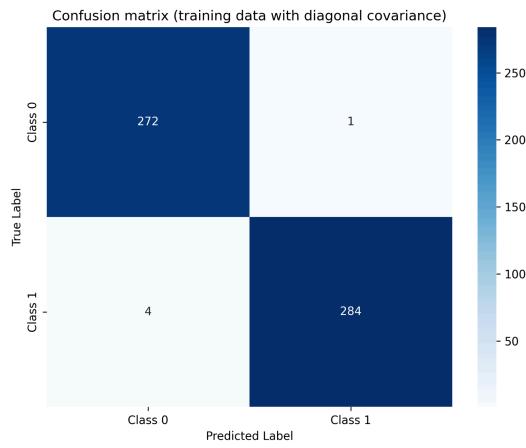
Scatterplots for Test- and Training-Data



Dataset-3

GMM based classifier with 8 Gaussians per class

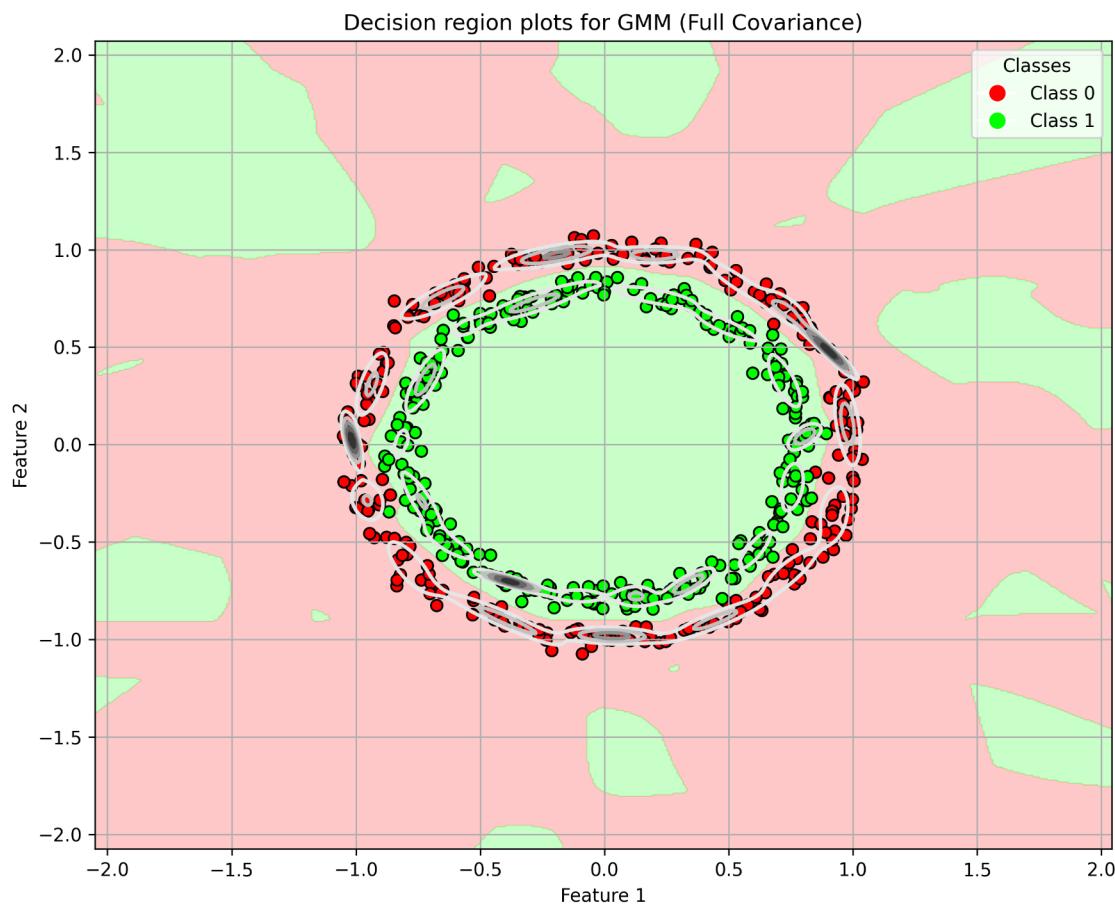
Confusion Matrices:

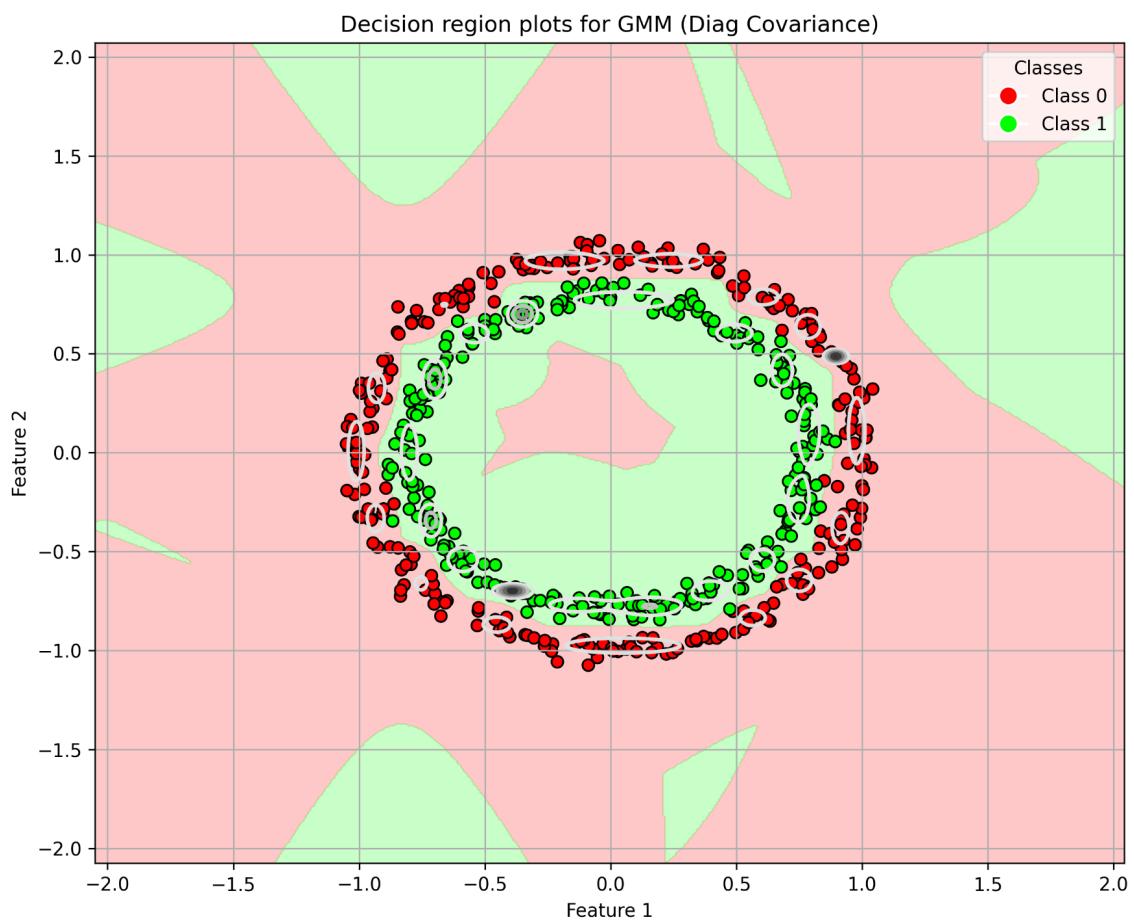


Accuracies:

Type	Train Accuracy	Test Accuracy
Full Covariance	99.47%	100%
Diagonal Covariance	99.11%	97.5%

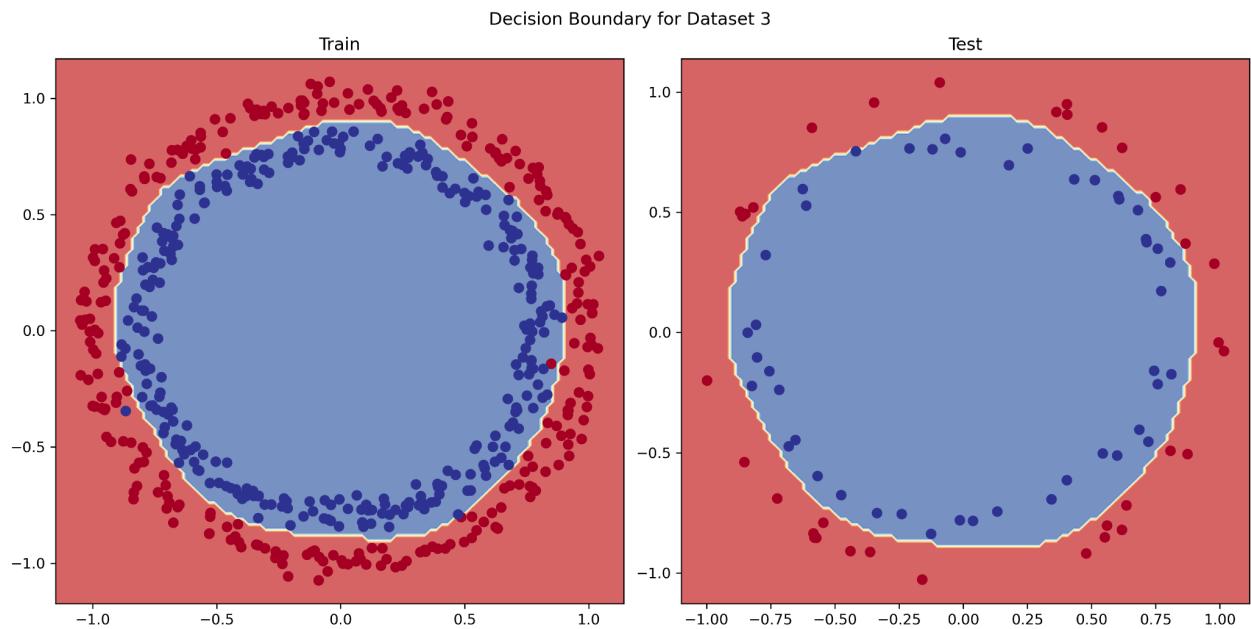
Decision Region Plots





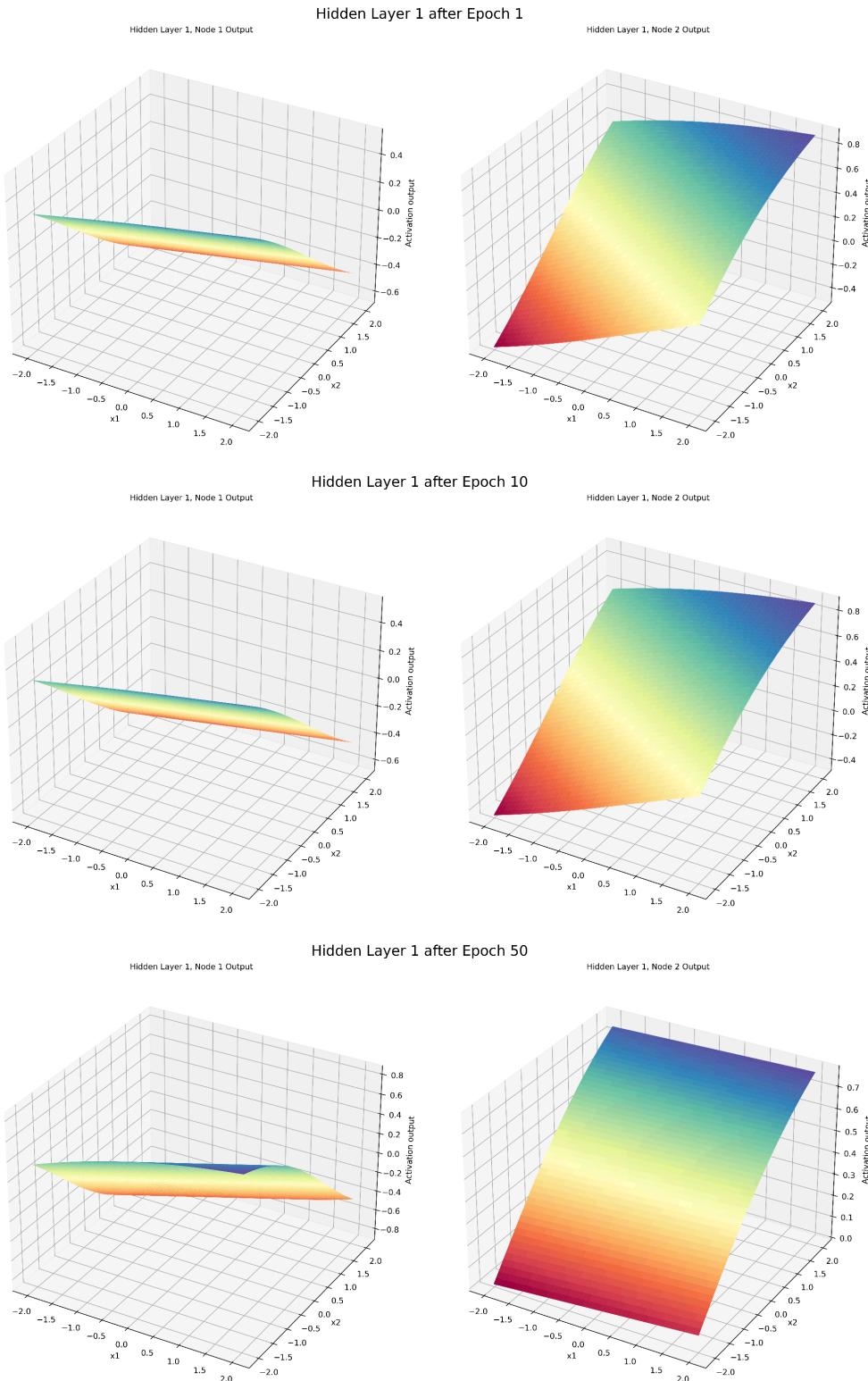
MLFFNN based classifier with two hidden layers

Decision Boundary

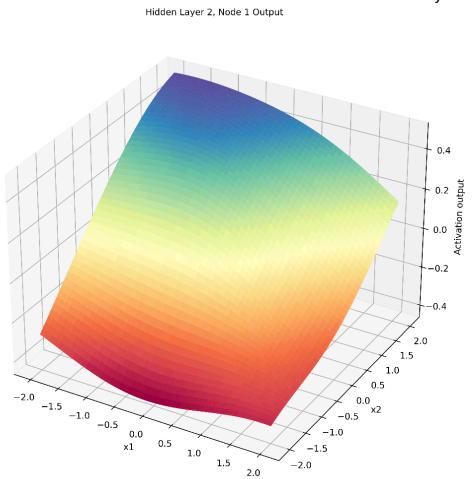


Surface Plots

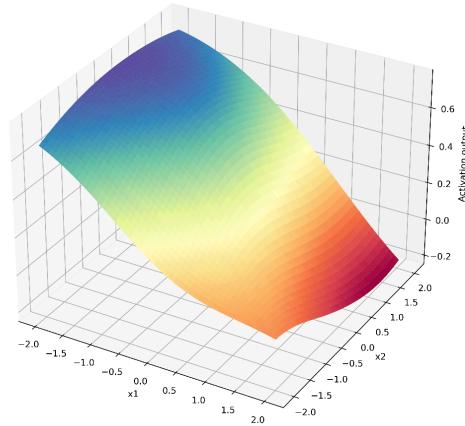
Nodes Nr. 1 and 2 have been chosen to be plotted for both hidden layers.



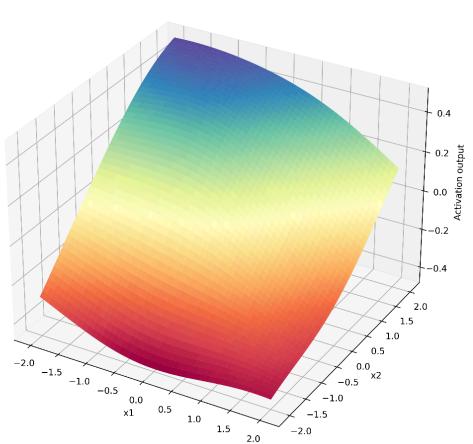
Hidden Layer 2 after Epoch 1



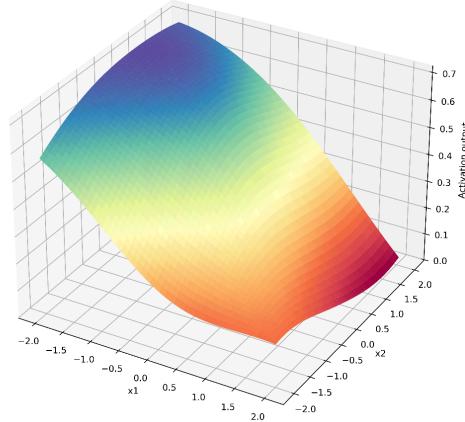
Hidden Layer 2, Node 2 Output



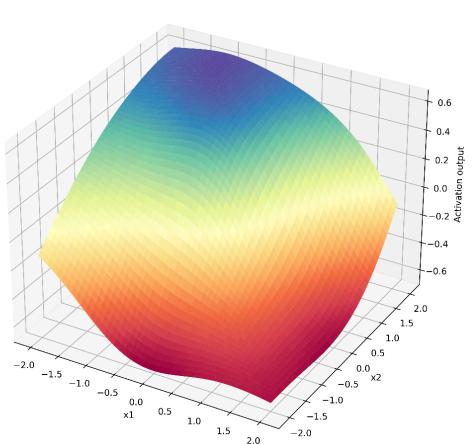
Hidden Layer 2 after Epoch 10



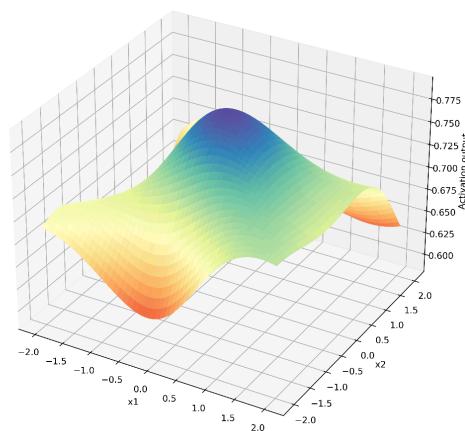
Hidden Layer 2, Node 2 Output



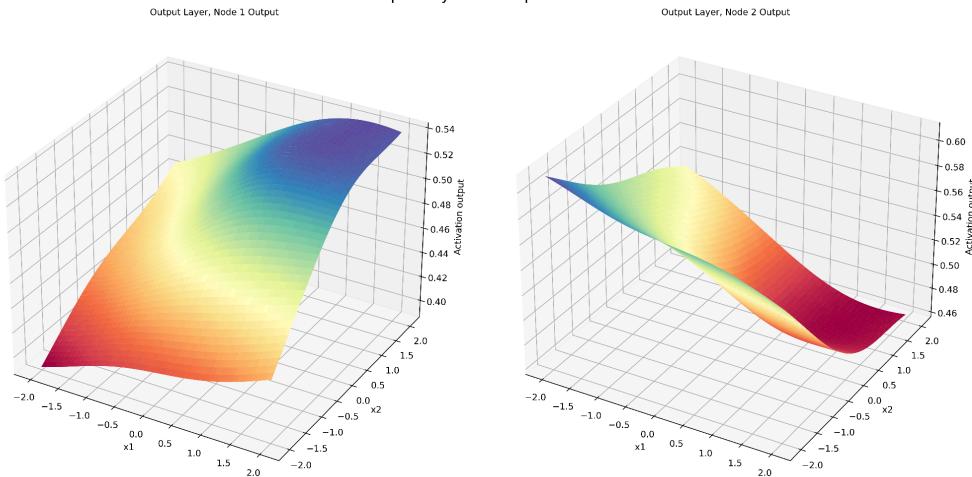
Hidden Layer 2 after Epoch 50



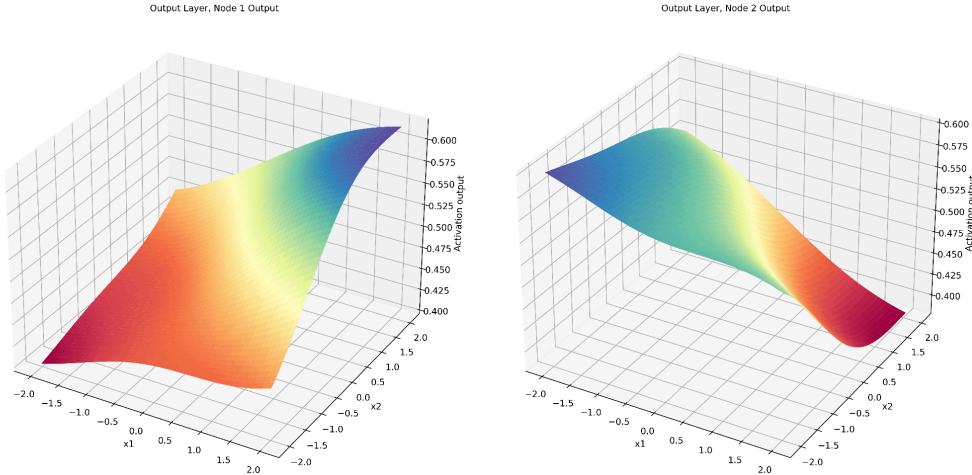
Hidden Layer 2, Node 2 Output



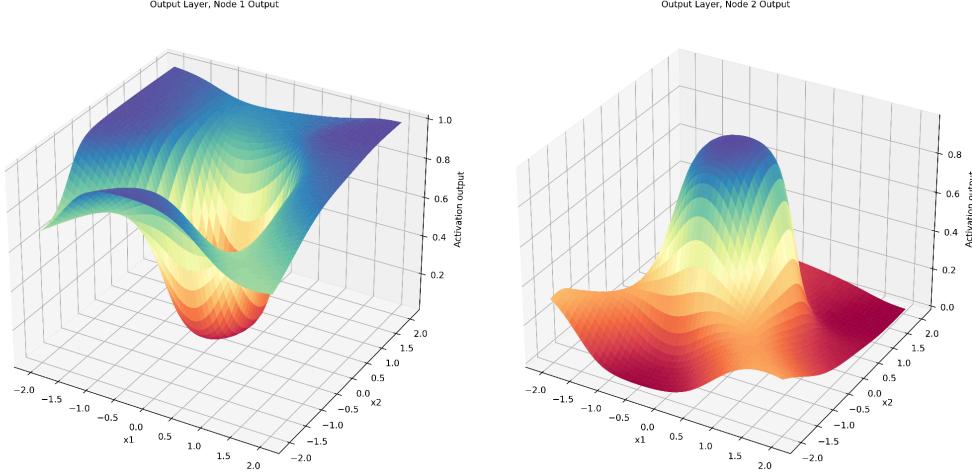
Output Layer after Epoch 1



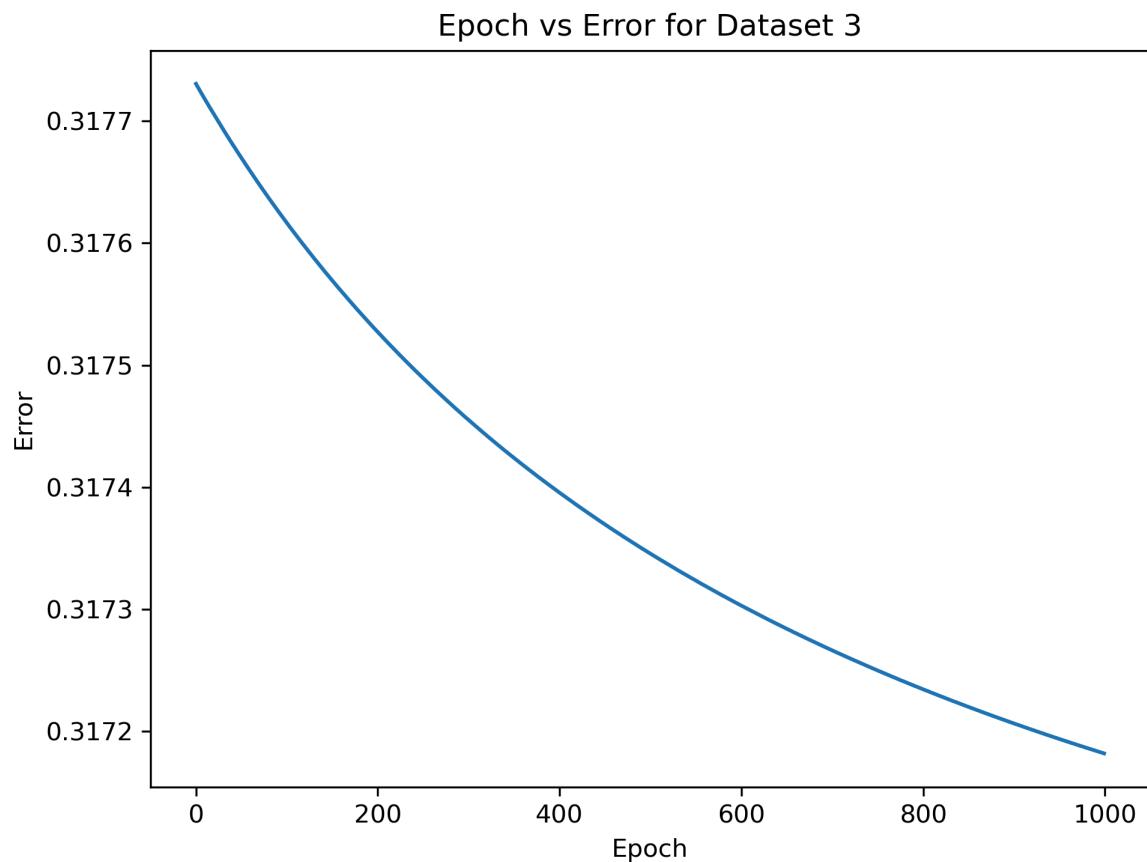
Output Layer after Epoch 10



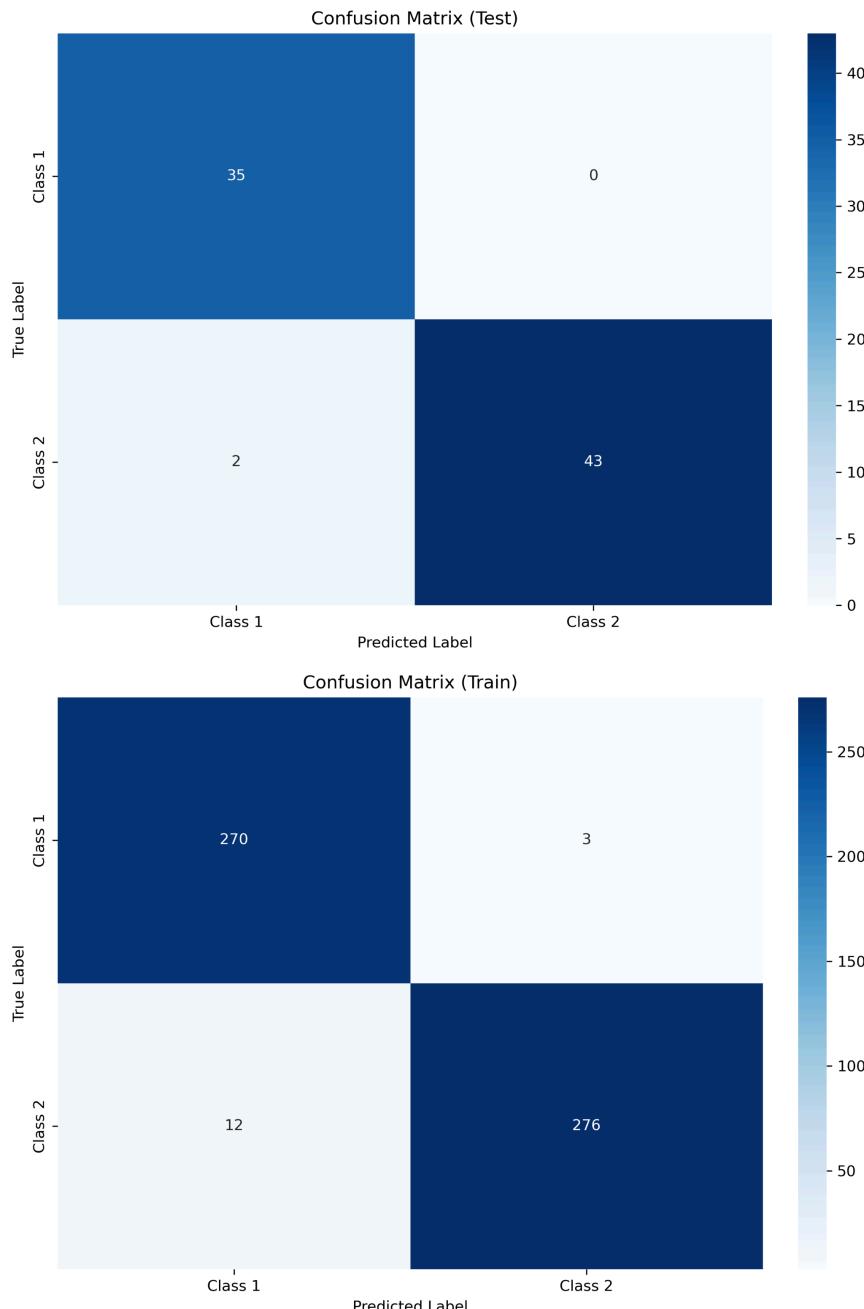
Output Layer after Epoch 50



Error vs Epoch Plot



Confusion Matrices

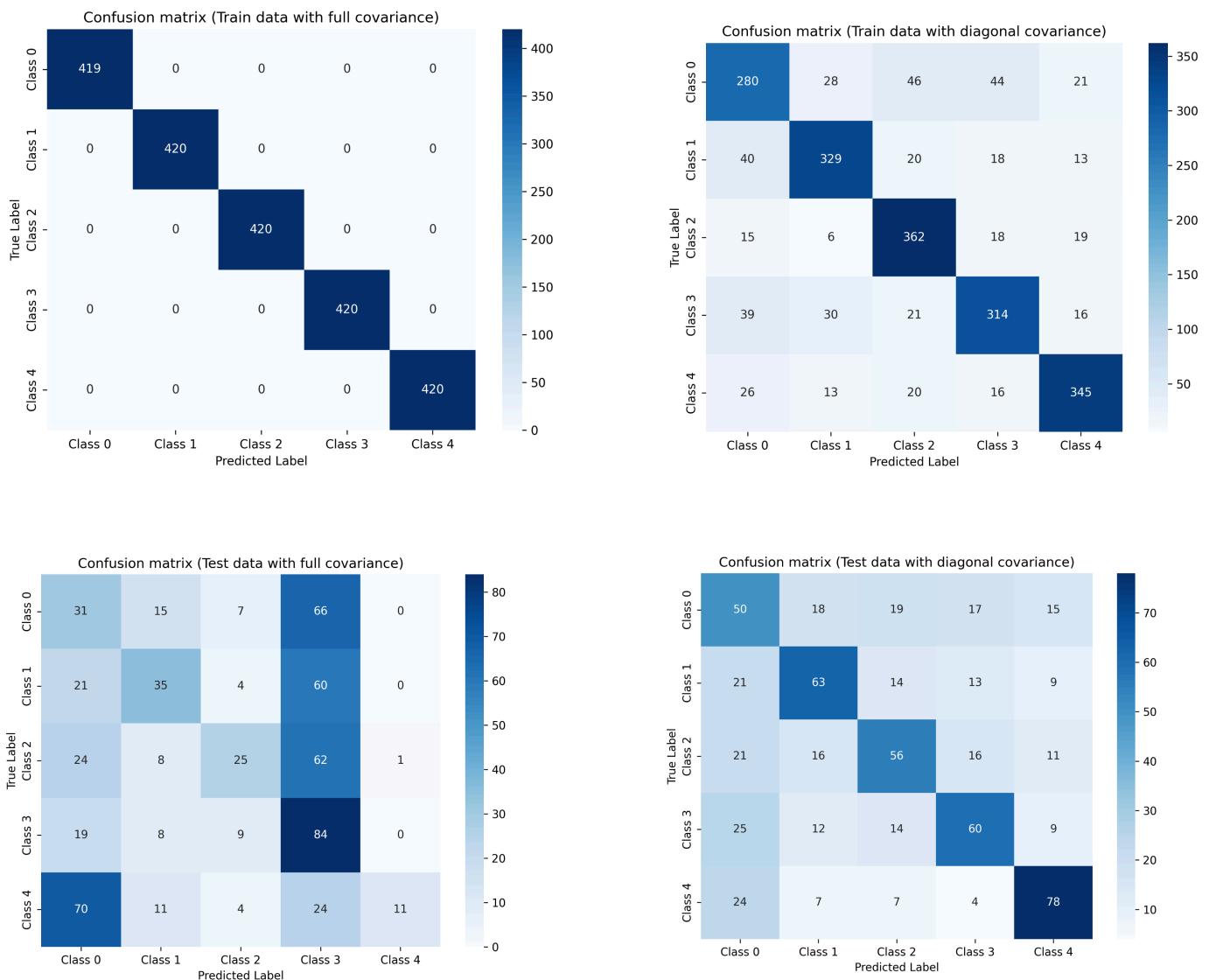


Train Accuracy	Test Accuracy
97.3%	97.4%

Dataset-4

a) GMM based classifier with 3 Gaussians per class

Confusion Matrices

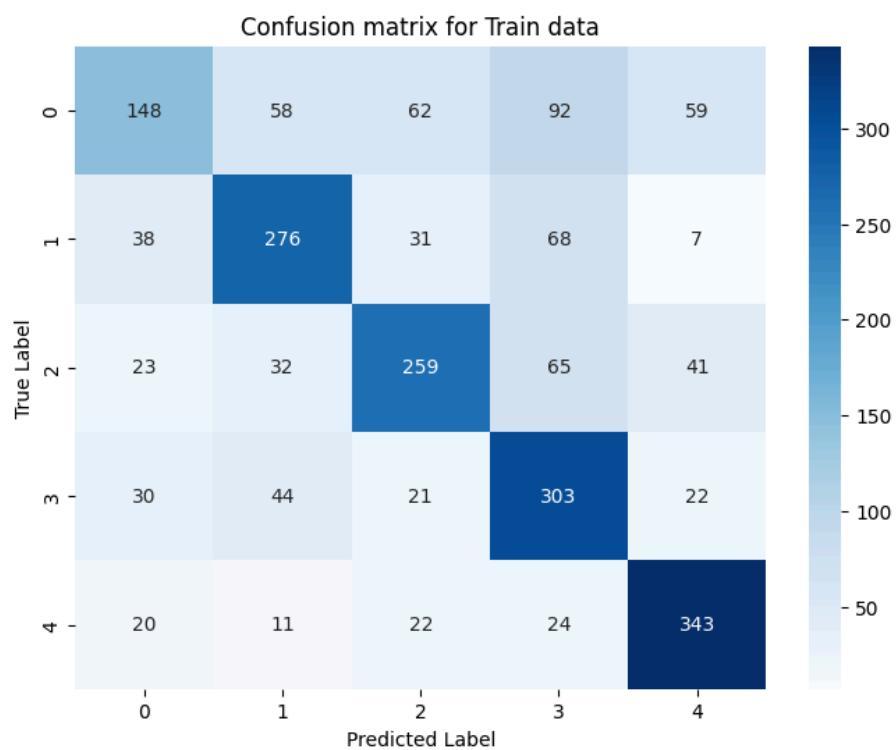


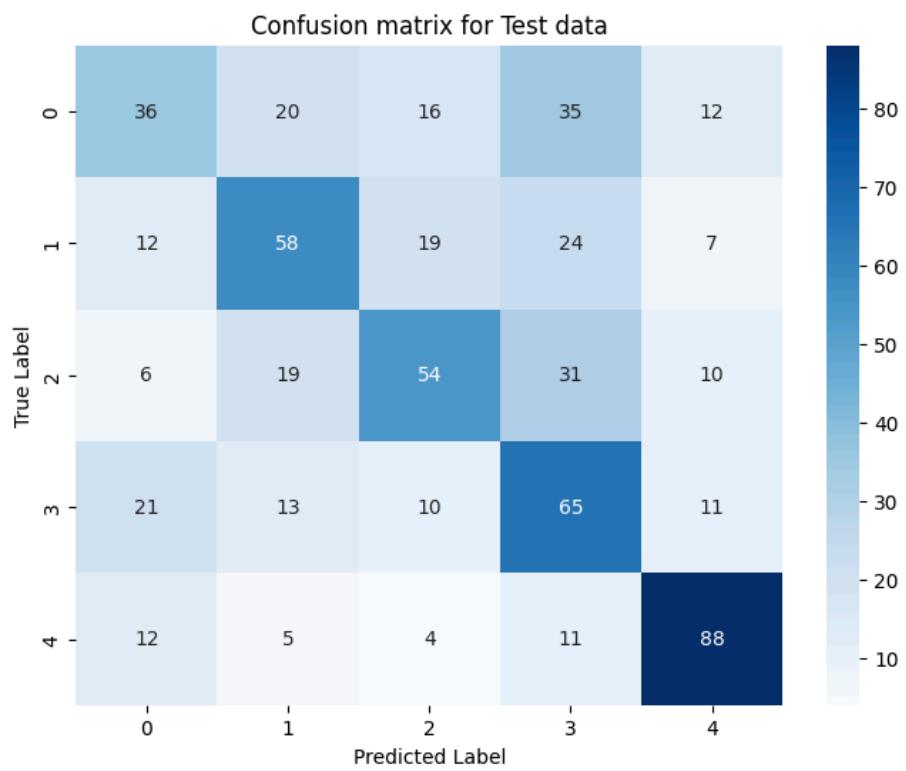
Accuracies

Type	Train Accuracy	Test Accuracy
Full Covariance	100%	31.05%
Diagonal Covariance	77.66%	51.25%

- b) MLFFNN based classifier with 25 nodes in the first hidden layer and 15 nodes in the second hidden layer

Confusion Matrices





Accuracies:

Type	Train Accuracy	Test Accuracy
MLFFNN classifier	63 %	50 %

Training error(ξ_{av}) vs epoch plot:

