Question 1)

Loss as a function of iterations:

Epoch [1/20], Iter [100/390] Loss: 1.6660, Time: 28.645514s

Epoch [2/20], Iter [100/390] Loss: 1.3151, Time: 56.470220s

Epoch [3/20], Iter [100/390] Loss: 1.0685, Time: 54.486418s

Epoch [4/20], Iter [100/390] Loss: 0.7990, Time: 53.809847s

Epoch [5/20], Iter [100/390] Loss: 1.1961, Time: 40.758102s

Epoch [6/20], Iter [100/390] Loss: 1.0559, Time: 41.908904s

Epoch [7/20], Iter [100/390] Loss: 0.8461, Time: 43.767223s

Epoch [8/20], Iter [100/390] Loss: 0.8259, Time: 45.875600s

Epoch [9/20], Iter [100/390] Loss: 0.9899, Time: 43.958851s

Epoch [10/20], Iter [100/390] Loss: 0.7911, Time: 55.285857s

Epoch [11/20], Iter [100/390] Loss: 0.8625, Time: 47.550201s

Epoch [12/20], Iter [100/390] Loss: 0.7253, Time: 43.430022s

Epoch [13/20], Iter [100/390] Loss: 0.6332, Time: 44.147546s

Epoch [14/20], Iter [100/390] Loss: 0.6720, Time: 44.913454s

Epoch [15/20], Iter [100/390] Loss: 0.7318, Time: 42.896964s

Epoch [16/20], Iter [100/390] Loss: 0.7891, Time: 48.446060s

Epoch [17/20], Iter [100/390] Loss: 0.7180, Time: 41.512276s

Epoch [18/20], Iter [100/390] Loss: 0.7783, Time: 42.596615s

Epoch [19/20], Iter [100/390] Loss: 0.7545, Time: 41.508047s

Epoch [20/20], Iter [100/390] Loss: 0.6979, Time: 43.213996s

ACCURACY OF MODEL:

Test Accuracy of the model on the 10000 test images: 67.10000 %

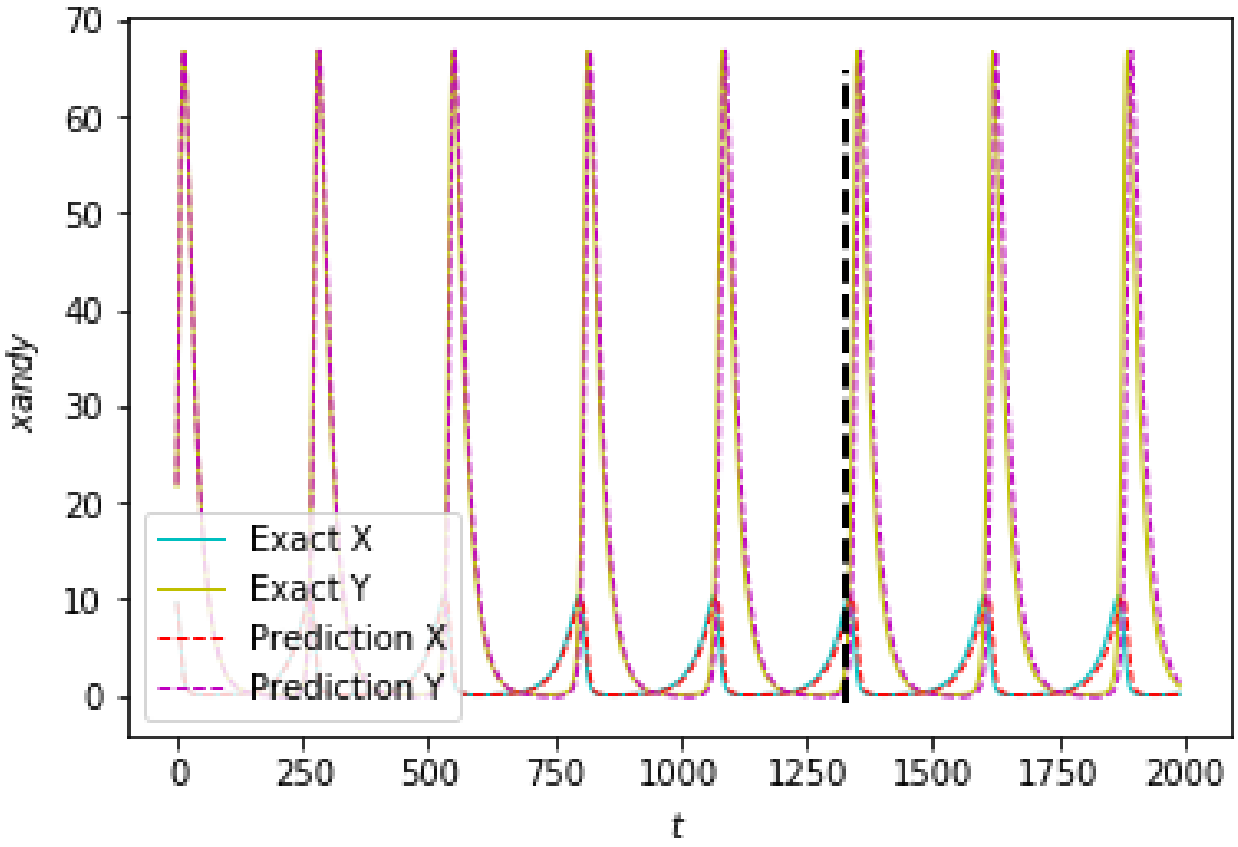
correct:6710 total:10000

CONFUSION MATRIX:

$$\begin{bmatrix} 696 & 24 & 74 & 18 & 14 & 8 & 6 & 10 & 85 & 65 \\ 10 & 841 & 10 & 4 & 0 & 3 & 6 & 2 & 23 & 101 \\ 78 & 2 & 667 & 47 & 34 & 64 & 39 & 37 & 16 & 16 \\ 29 & 7 & 142 & 450 & 31 & 192 & 45 & 36 & 25 & 43 \\ 33 & 3 & 188 & 84 & 487 & 54 & 53 & 69 & 20 & 9 \\ 21 & 5 & 110 & 148 & 29 & 586 & 17 & 52 & 15 & 17 \\ 9 & 10 & 87 & 91 & 22 & 27 & 714 & 11 & 15 & 14 \\ 31 & 10 & 65 & 46 & 31 & 72 & 4 & 706 & 3 & 32 \\ 74 & 40 & 16 & 5 & 5 & 2 & 8 & 4 & 802 & 44 \\ 39 & 96 & 10 & 11 & 2 & 3 & 3 & 10 & 26 & 800 \end{bmatrix}$$

QUESTION 2)

Plot of predicted and exact signals:



Discrepancy within the test interval in the relative $\mathbf{L_2}$ norm.

L2 in X = 0.4255546765220179

L2 in Y =0.45995498387305755