

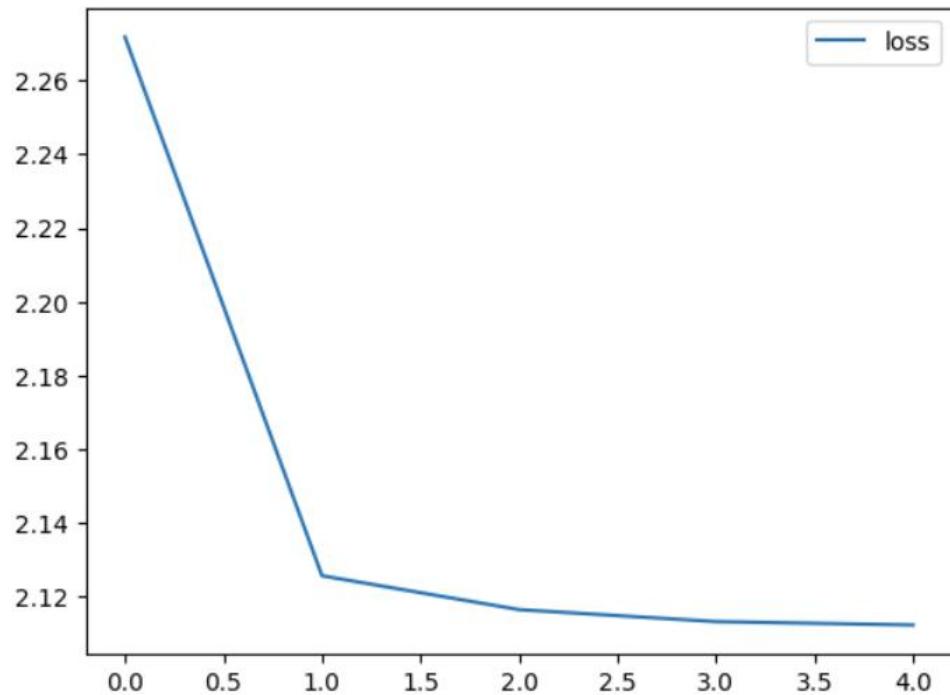
HW 5: Important Figures and Questions

Overall Table:

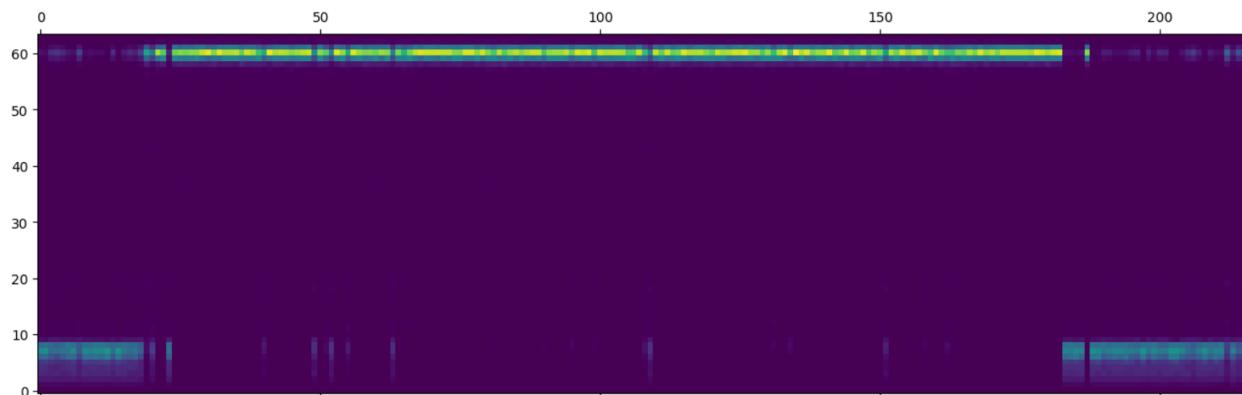
predict length	conv window	conv units	ML rms error	MMSE rms error
10	2	5	0.56705	0.62145
10	2	10	0.56451	0.60915
10	2	40	0.59438	0.68307
30	2	10	0.52961	0.50852
50	2	10	0.50789	0.47062
80	2	10	0.49781	0.46501
30	4	10	0.52224	0.52567
30	8	10	0.52287	0.49366
50	2	40	0.52211	0.48132
80	10	10	0.59528	0.45814

Case 1: Window Size = 10, conv_window = 2, conv_units = 5

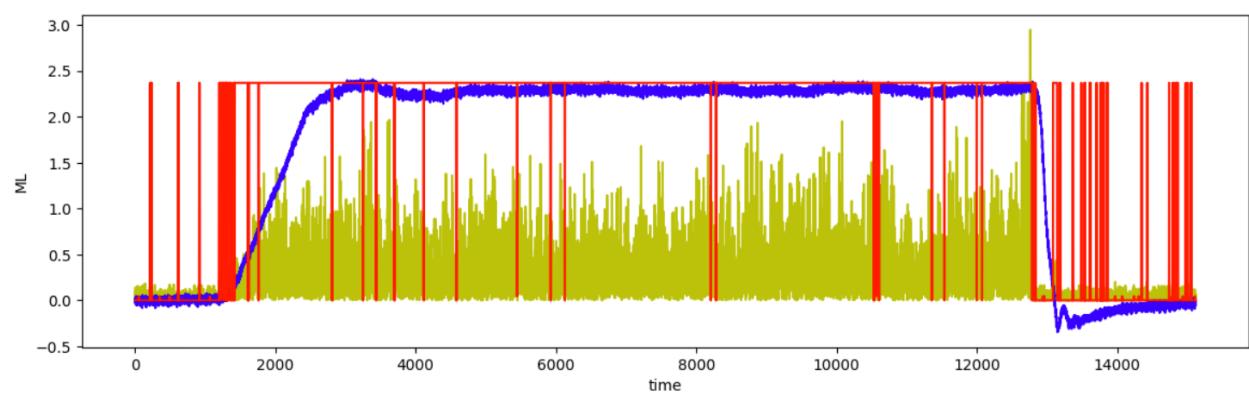
Losses Plot:



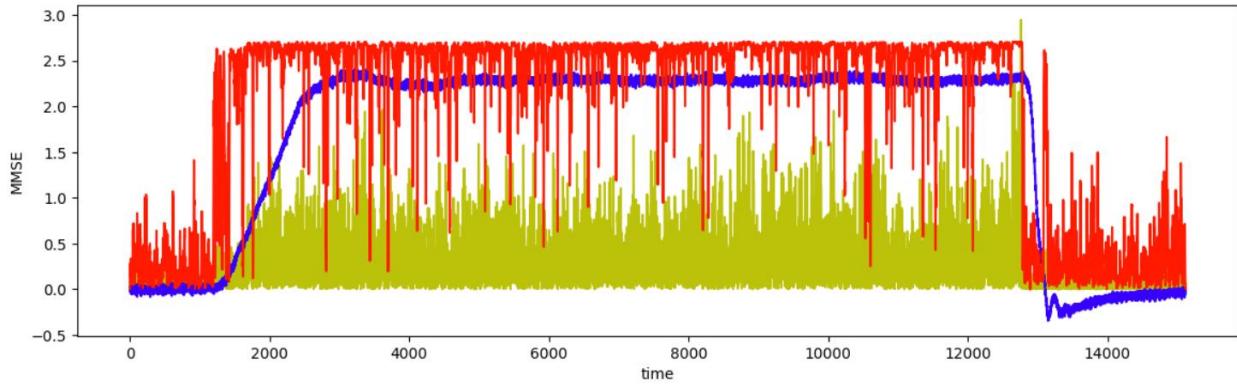
The $p(x, t)$ graph of the predicted values (the output of the network):



This is the ML graph:

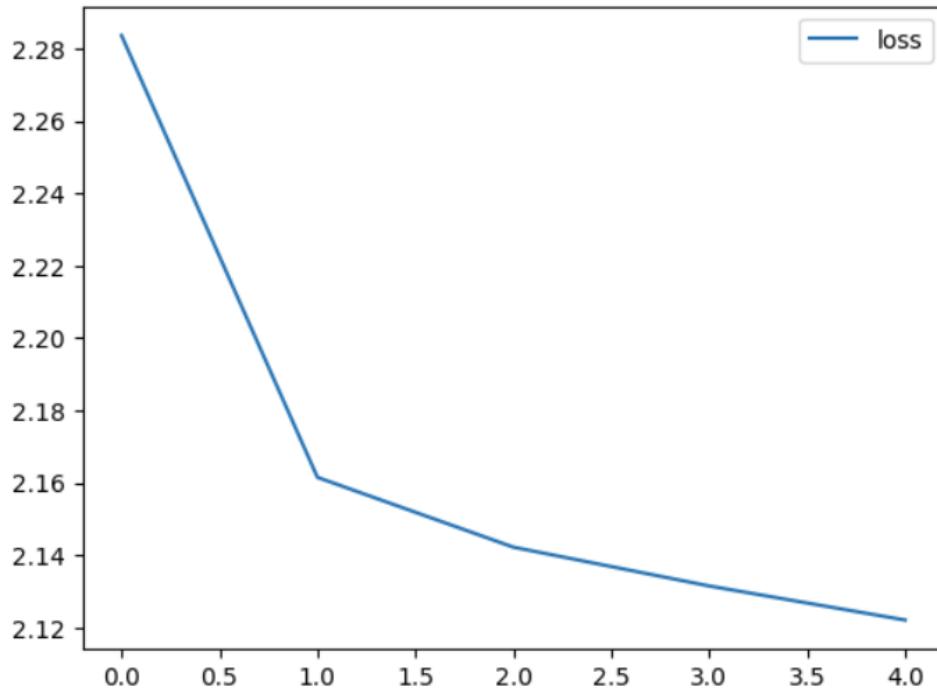


This is the MMSE graph:

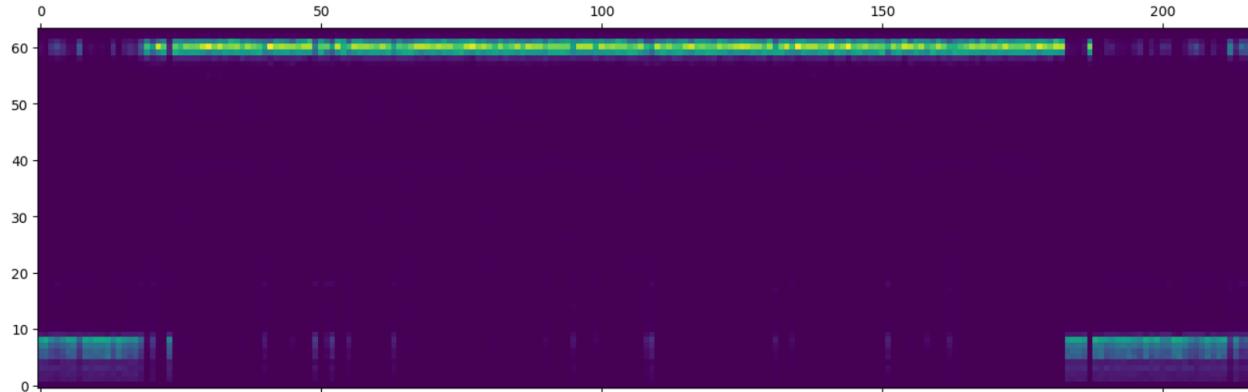


Case 2: Window Size = 10, conv_window = 2, conv_units = 40

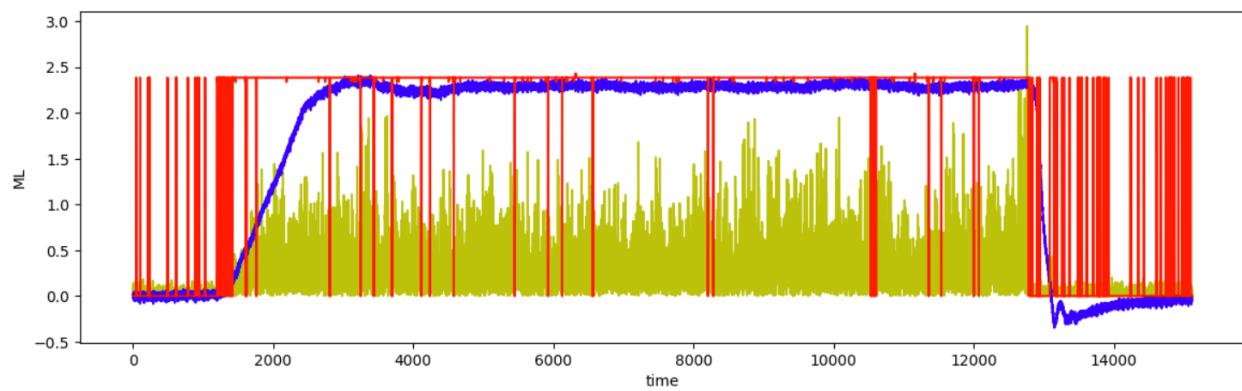
Losses Plot:



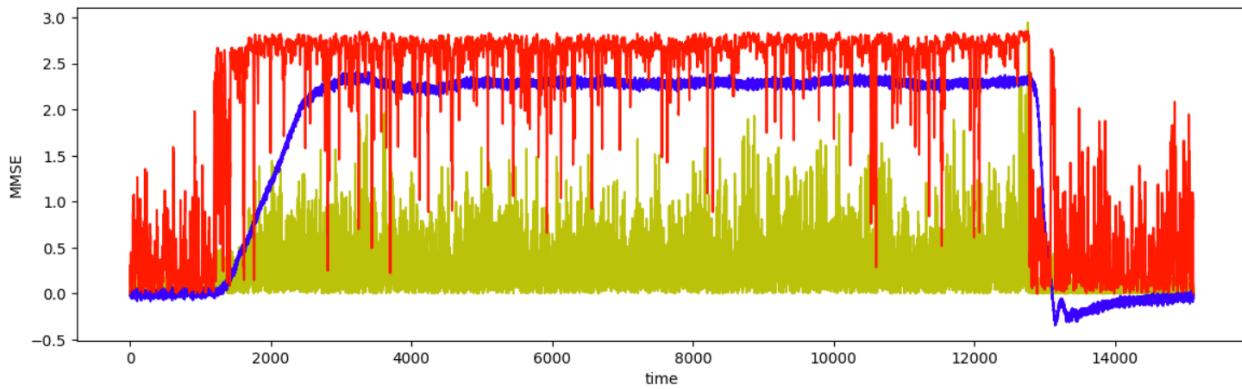
The $p(x, t)$ graph of the predicted values (the output of the network):



This is the ML graph:

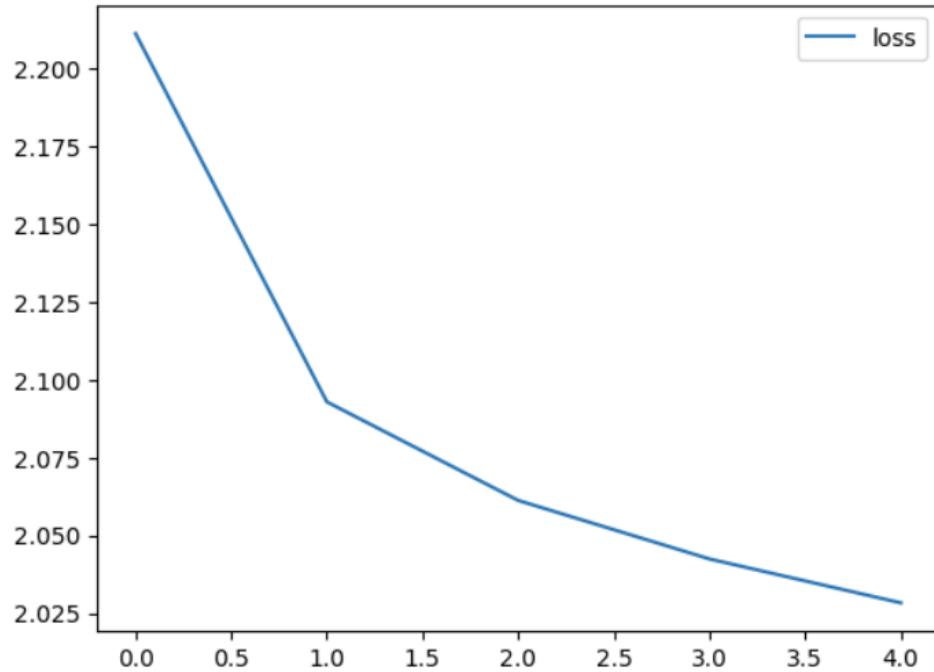


This is the MMSE graph:

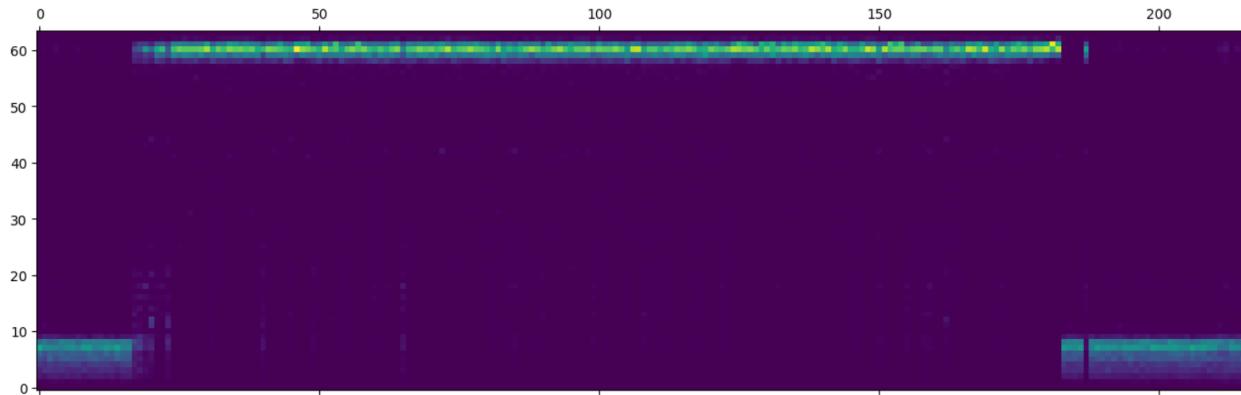


Case 3: Window Size = 50, conv_window = 2, conv_units = 10

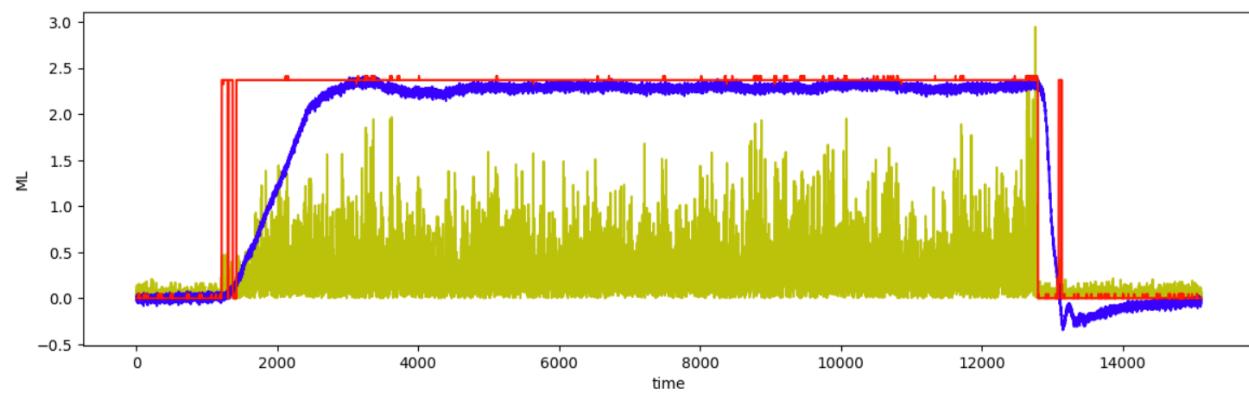
Losses Plot:



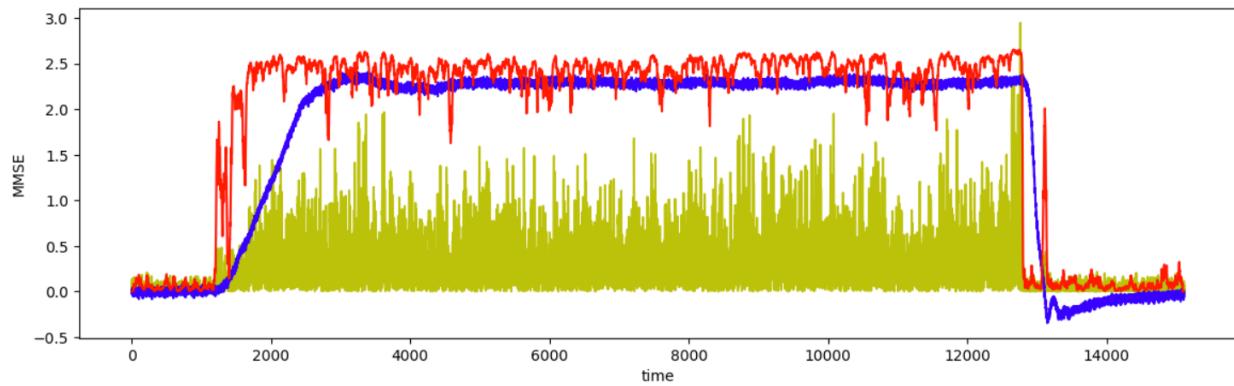
The $p(x, t)$ graph of the predicted values (the output of the network):



This is the ML graph:

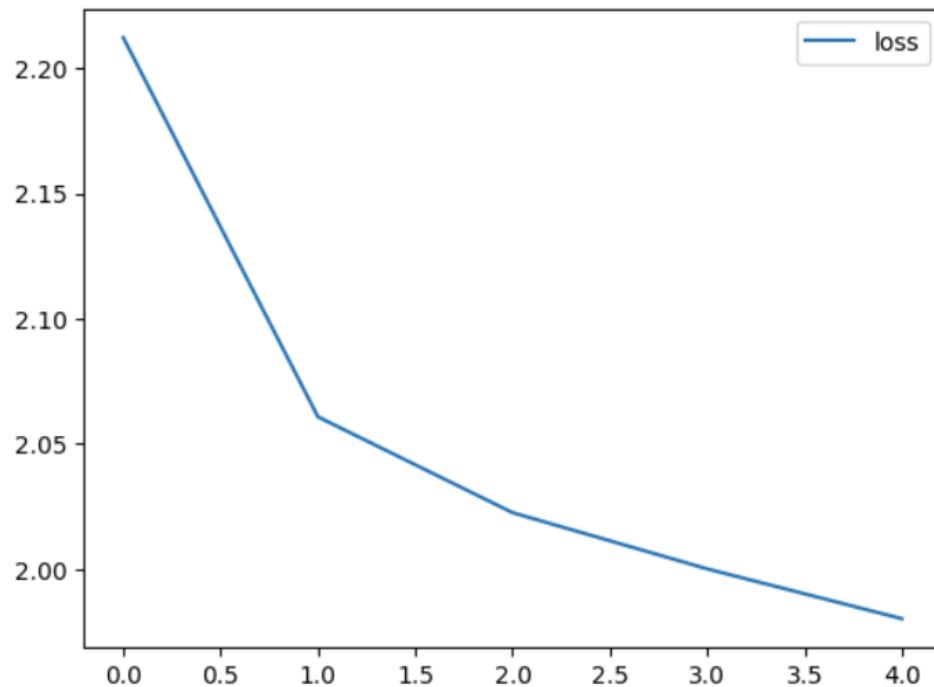


This is the MMSE graph:

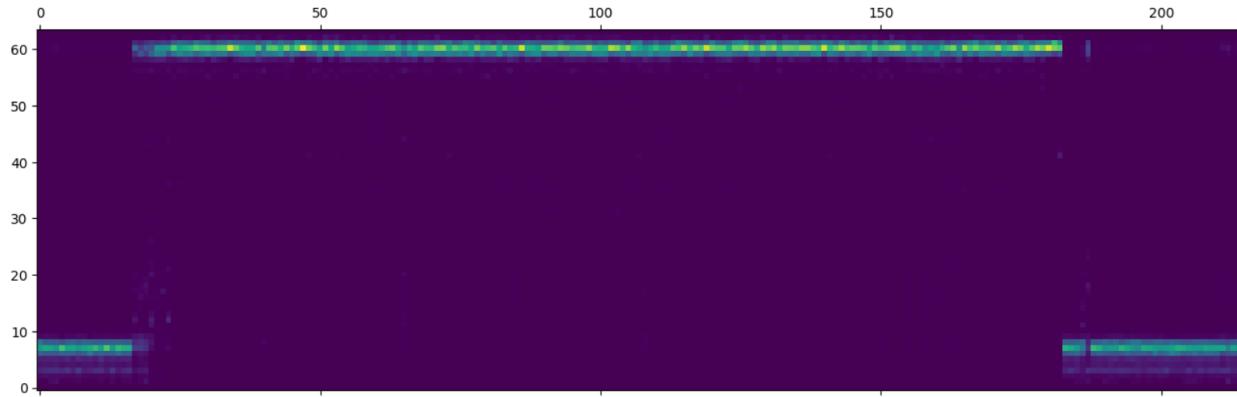


Case 4: Window Size = 80, conv_window = 2, conv_units = 10

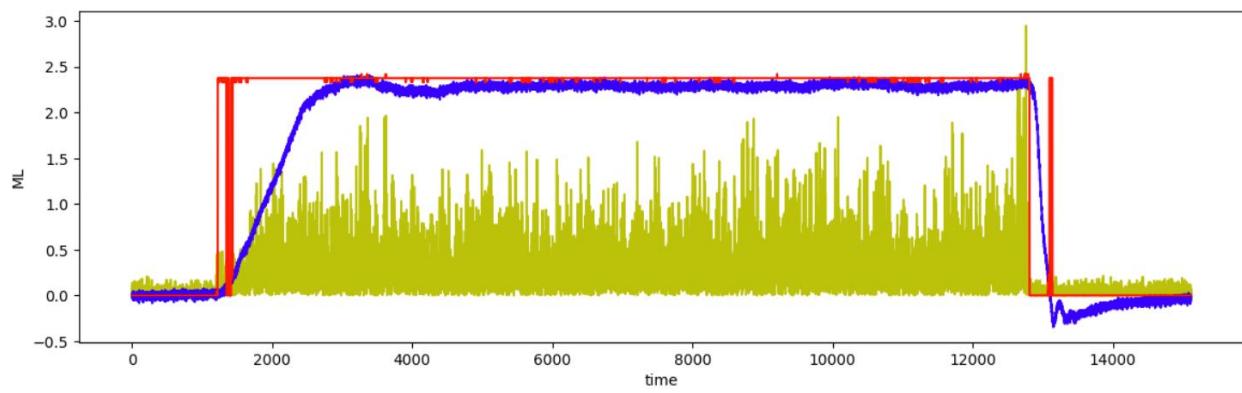
Losses Plot:



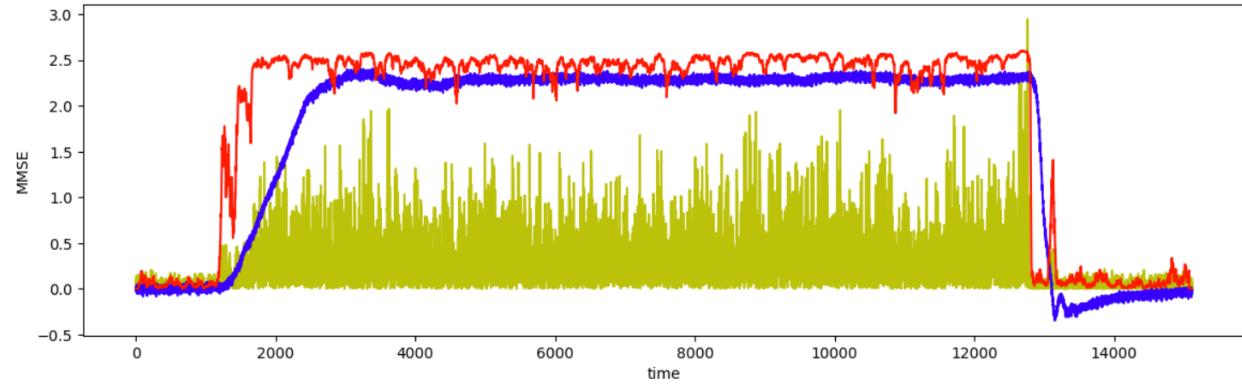
The $p(x, t)$ graph of the predicted values (the output of the network):



This is the ML graph:



This is the MMSE graph:



General Questions:

What conclusions can you draw from the results?

1. It is clear that increasing the predict length decreases the error when holding the other variables constant. This makes sense as increasing the predict length gives the network more information to make its prediction on.

2. Increasing the number of convolutional units did not change the errors substantially in a definite pattern. In some cases shown on the table increasing the number of units decreased the error, sometimes it increased, and sometimes it barely changed.
3. Increasing the convolution window generally causing the error to increase. One explanation is because increasing the length of the convolution window while holding the other parameters constant means that we will have less convolutions per time period, as we cannot have an edge cases where the filter is only partially over the data.
4. Comparing the ML to the MMSE errors, the ML has smaller errors when the predict length is smaller (at 10), and the MMSE has better error when the predict length is bigger (at 30, 50, 80), although there is one case when predict length is 30 where both have roughly the same error.