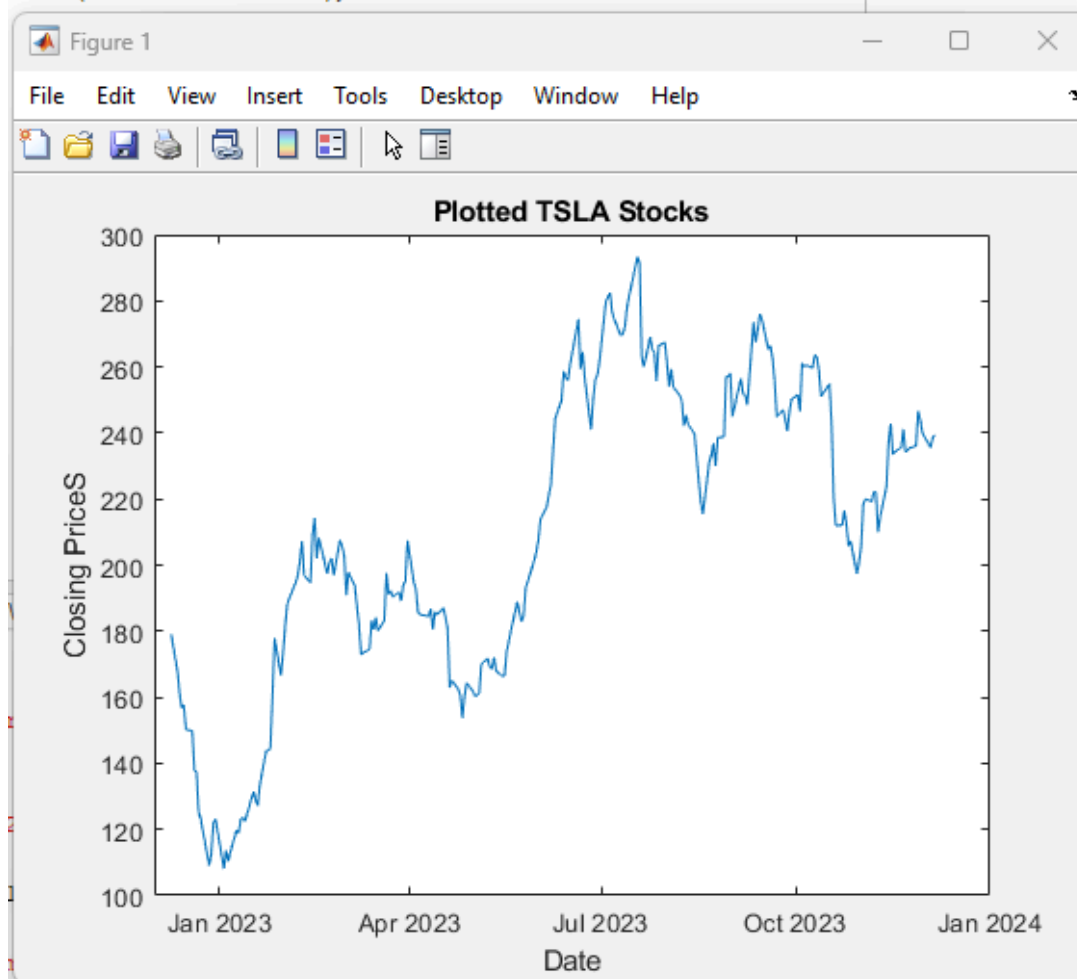


First steps:

I used the most recent(from last December of 2022 to current December 7th, 2023) for the TESLA data and I used it daily just so there is a lot of data for Matlab to work with(it essentially resulted in an excel file filled 250 integers, meaning matlab will work with 250 prices).

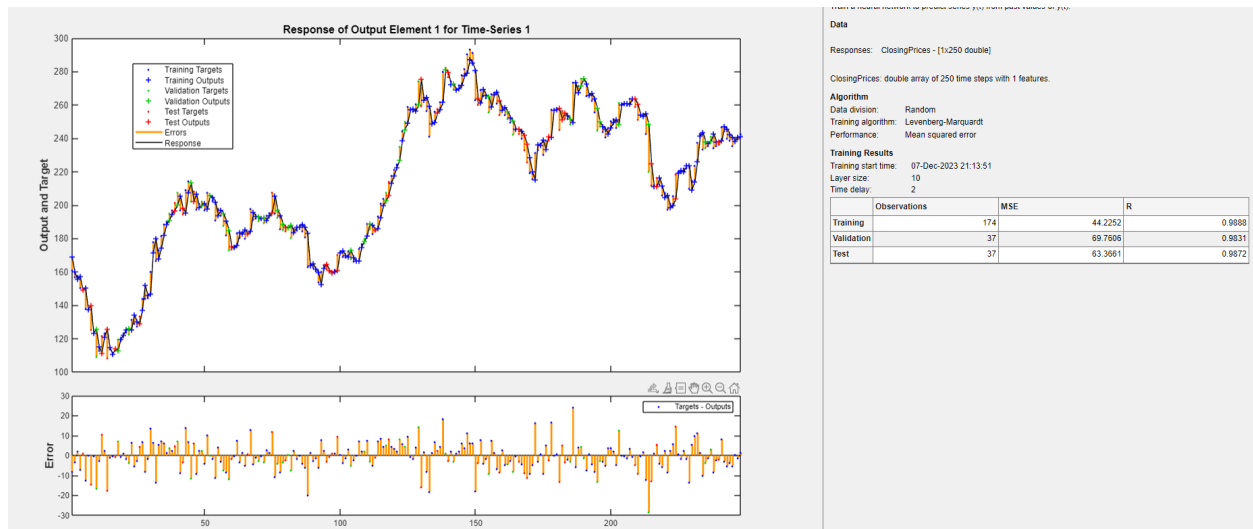
I first plotted the closing prices with the dates just to understand how it looks before its used with NAR:

```
x = readtable('TLSA.xlsx', 'Range', 'A2:A250');  
y = readtable('TLSA.xlsx', 'Range', 'E2:E250');  
figure;  
plot(x{:,:}, y{:,:});  
xlabel('Date');  
ylabel('Closing Prices')  
title('Plotted Tesla Stocks');
```



Setting up NAR:

After plotting, I went to the Neural Network Time Series app on matlab to create a network. I created a 2nd excel file with just the closing prices.

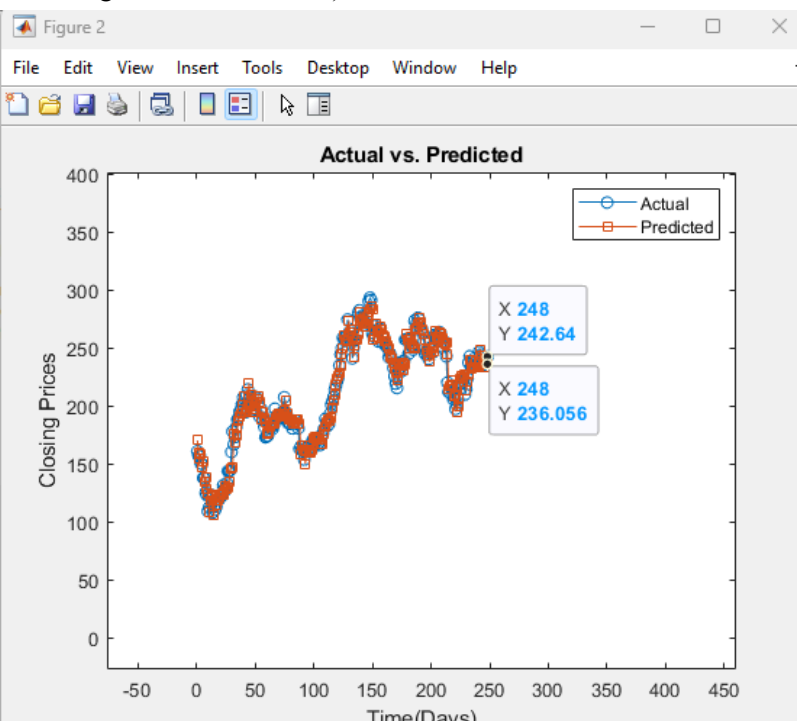


After the training was done and I looked through the response diagrams that was viewable, I exported the code and modified it so it outputted a graph of the actual data from before next to predicted points from the NAR(which resembles the response diagram but isn't exact).

```
% Connection from the output layer.
netc = closeloop(net);
netc.name = [net.name ' - Closed Loop'];
view(netc)
[xc,xic,aic,tc] = preparets(netc,[],T);
yc = netc(xc,xic,aic);
closedLoopPerformance = perform(netc,tc,yc)

% Step-Ahead Prediction Network
% For some applications it helps to get the predicted
% The original network returns predicted y(t+1) at
% given y(t+1). For some applications such as decision
% help to have predicted y(t+1) once y(t) is available
% actual y(t+1) occurs. The network can be made to
% timestep early by removing one delay so that its
% 0 instead of 1. The new network returns the same
% network, but outputs are shifted left one timestep
nets = removedelay(netc);
nets.name = [netc.name ' - Predict One Step Ahead'];
view(nets)
[xs,xis,ais,ts] = preparets(nets,[],T);
ys = nets(xs,xis,ais);
stepAheadPerformance = perform(nets,ts,ys)

% Plot the Prediction Points
figure;
plot(cell2mat(t), '-o', 'DisplayName', 'Actual');
hold on;
plot(cell2mat(y), '-s', 'DisplayName', 'Predicted');
title('Actual vs. Predicted');
xlabel('Time(Days)');
ylabel('Closing Prices');
legend('Actual', 'Predicted');
hold off;
```



After looking at all 3 graphs, I can predict that it will go up slightly(past 240 to maybe 250) the next few days until the January of 2023 as I noticed that it occasionally fluctuates month to month(prices peaked in the summer, specifically July and has declined since) and currently the stock prices are going up.