Lab Report No 3

Fall 2021

Digital Signal Processing lab

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Section: A

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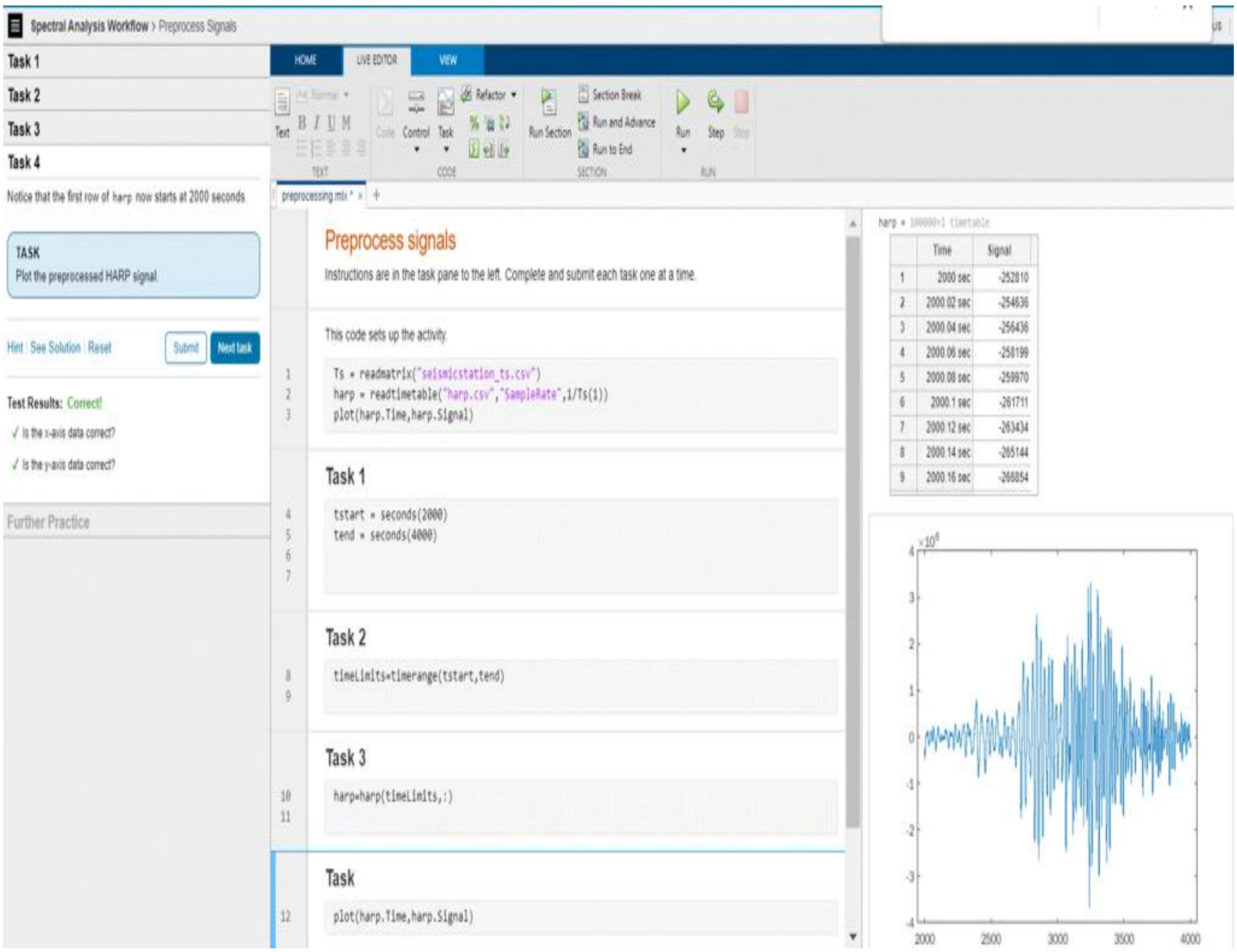
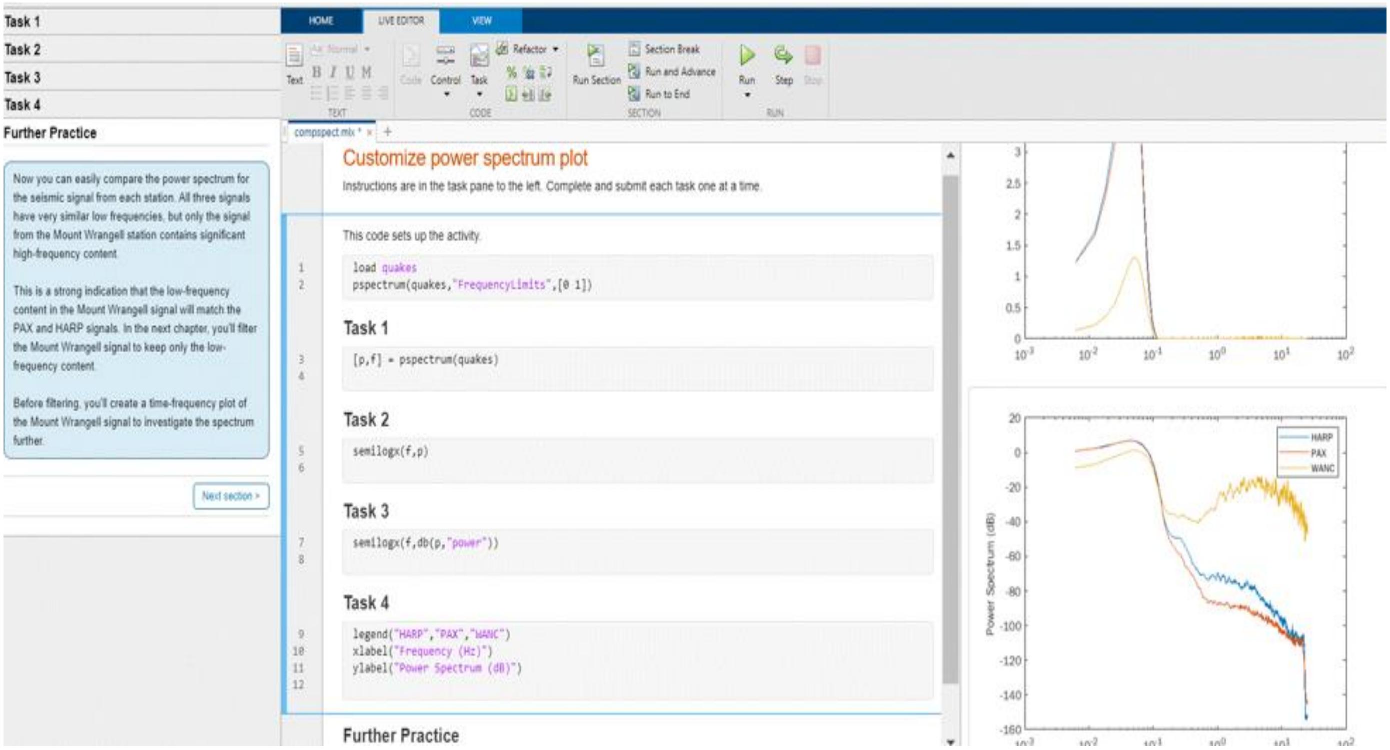
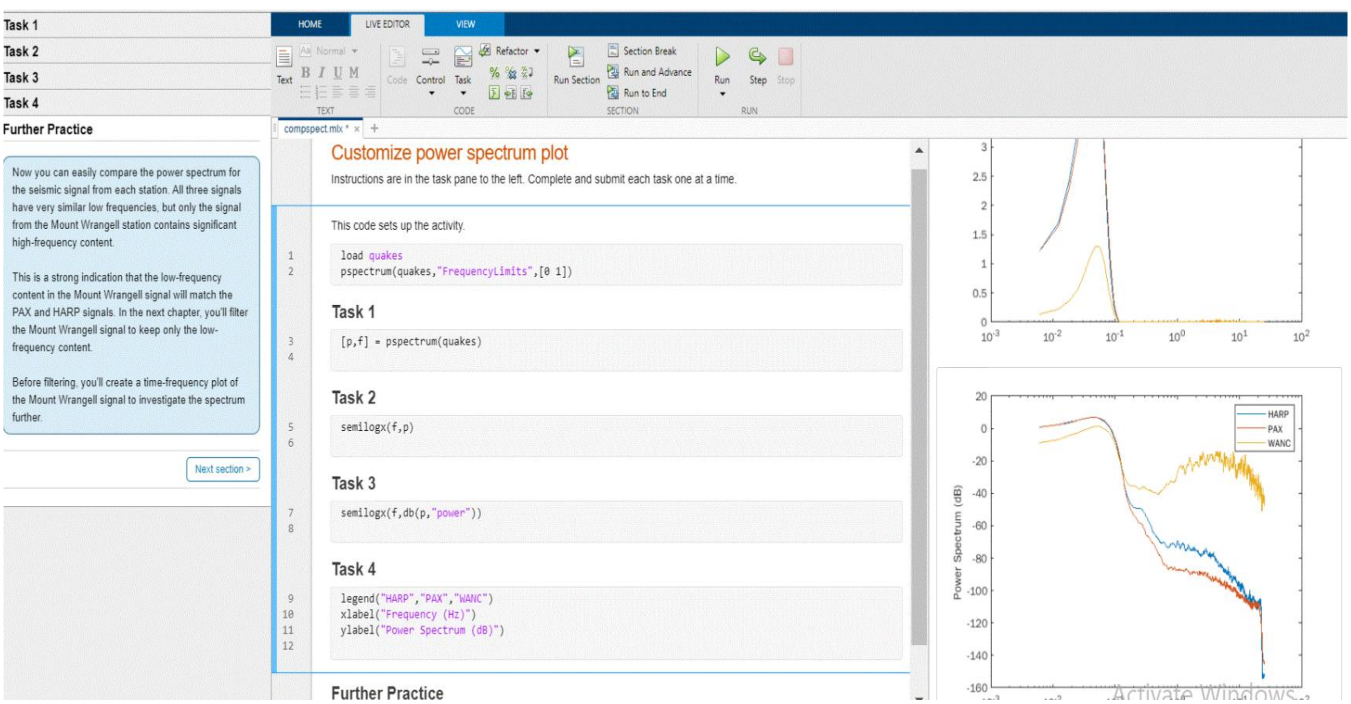
Spectral Analysis Workflow: -

Workflow of this course is to import the signal and then preprocess for furthering operation.

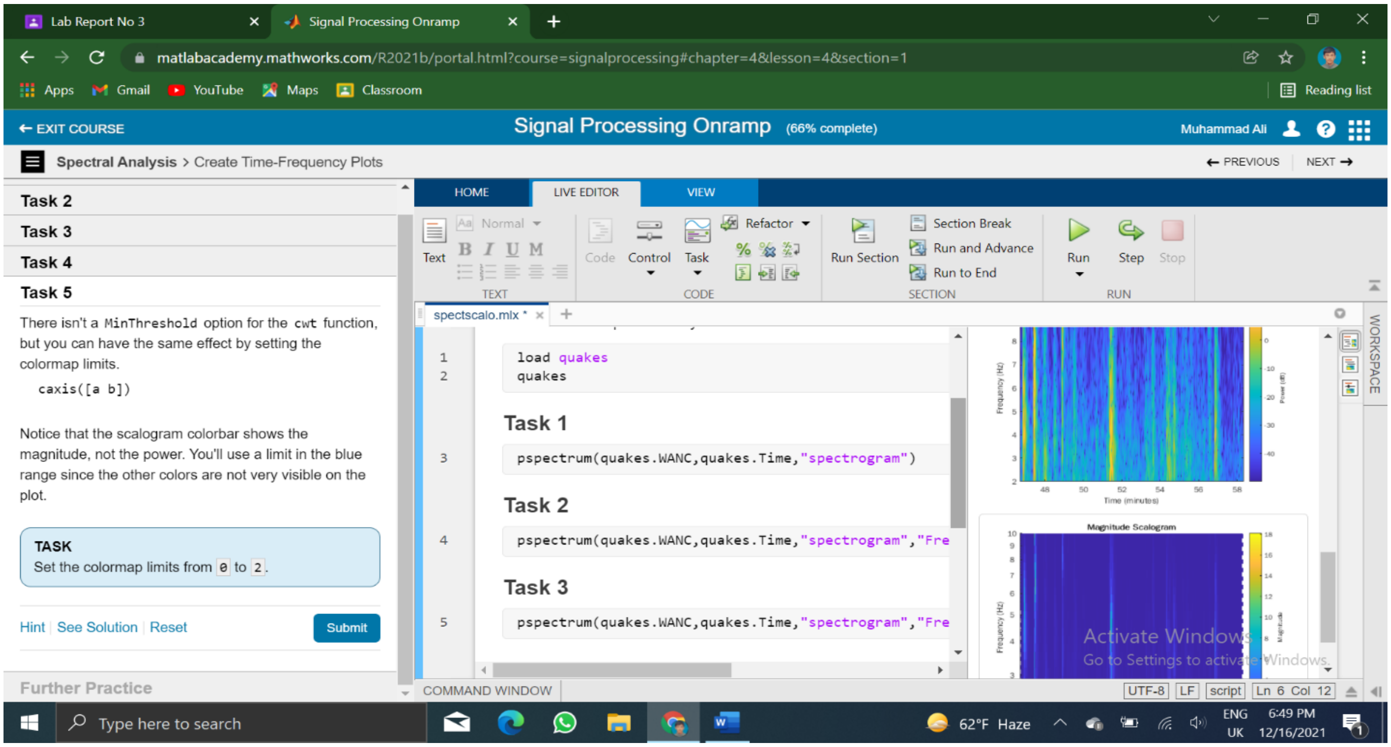


Preprocessing Signals: -





Spectral Analysis: -



Filtering: -

Now the spectrogram contains more details, but the area around the bands is still quite noisy.

There are more options you can set while creating spectrograms, but you can also try different time-frequency visualization methods.

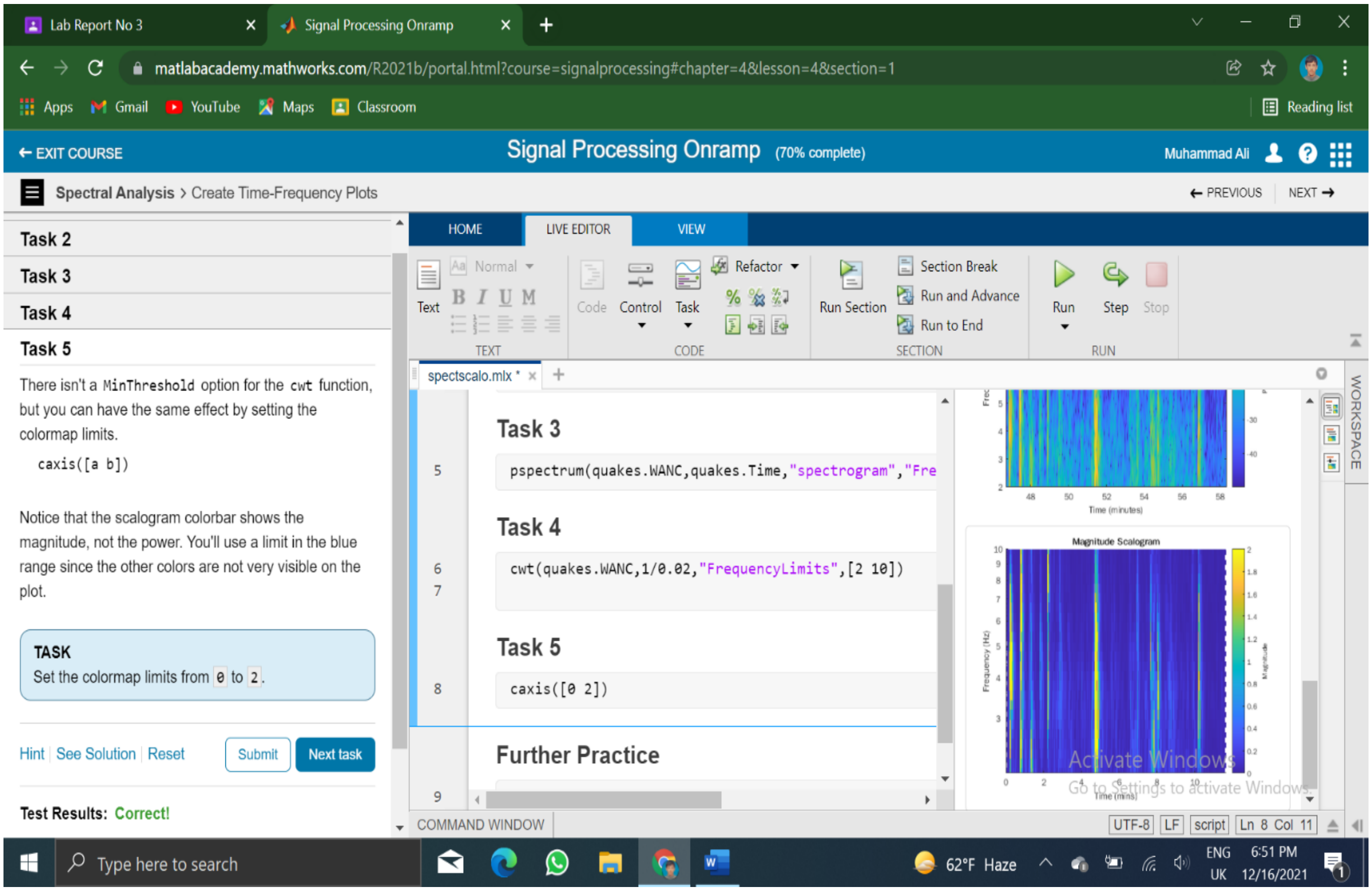
You can create scalograms with the `cwt` function.

```
cwt(sig,fs)
```

The first input is the signal, and the second input is the sample rate.

You can also set the frequency limits with the `cwt` function.

```
cwt(sig,fs, ...
    "FrequencyLimits",[a b])
```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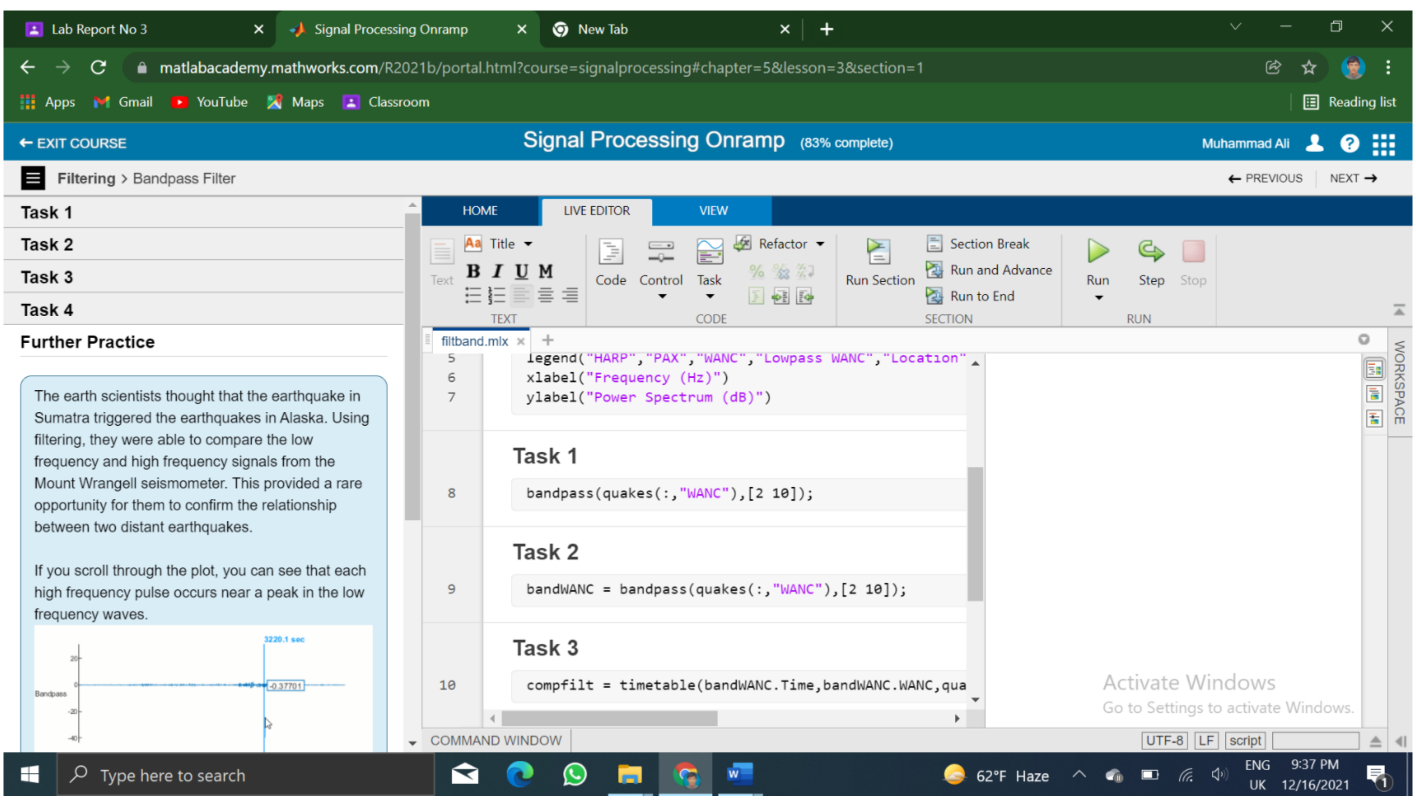
Signal Processing Onramp
matlabacademy.mathworks.com/R2021b/portal.html?course=signalprocessing#chapter=4&lesson=4&section=1
EXIT COURSE
Signal Processing Onramp (70% complete)
Muhammad Ali
Spectral Analysis > Create Time-Frequency Plots
PREVIOUS
NEXT
Task 2
Task 3
Task 4
Task 5
There isn't a MinThreshold option for the cwt function, but you can have the same effect by setting the colormap limits.
caxis([a b])
Notice that the scalogram colorbar shows the magnitude, not the power. You'll use a limit in the blue range since the other colors are not very visible on the plot.
TASK
Set the colormap limits from 0 to 2.
Hint
See Solution
Reset
Submit
Next task
Test Results: Correct!
spectscalo.mlx
Task 3
pspectrum(quakes.WANC,quakes.Time,"spectrogram","Fre
Task 4
cwt(quakes.WANC,1/0.02,"FrequencyLimits",[2 10])
Task 5
caxis([0 2])
Further Practice
Magnitude Scalogram
COMMAND WINDOW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Signal Processing Onramp
New Tab
matlabacademy.mathworks.com/R2021b/portal.html?course=signalprocessing#chapter=5&lesson=3&section=1
EXIT COURSE
Signal Processing Onramp (83% complete)
Muhammad Ali
Filtering > Bandpass Filter
PREVIOUS
NEXT
Task 1
Task 2
Task 3
Task 4
Further Practice
The earth scientists thought that the earthquake in Sumatra triggered the earthquakes in Alaska. Using filtering, they were able to compare the low frequency and high frequency signals from the Mount Wrangell seismometer. This provided a rare opportunity for them to confirm the relationship between two distant earthquakes.
If you scroll through the plot, you can see that each high frequency pulse occurs near a peak in the low frequency waves.
filtband.mlx
legend("HARP","PAX","WANC","Lowpass WANC","Location"
xlabel("Frequency (Hz)")
ylabel("Power Spectrum (dB)")
Task 1
bandpass(quakes(:,"WANC"),[2 10]);
Task 2
bandWANC = bandpass(quakes(:,"WANC"),[2 10]);
Task 3
compfilt = timetable(bandWANC.Time,bandWANC.WANC,qua
COMMAND WINDOW

Signal Measurement: -

Here I Extract information from signals which is filter by lowpass highpass.