

LabVIEW Crash Course Worksheet

Important Shortcuts

Clear Broken Lines Ctrl-B
Run Program Ctrl-R
Copy/drag Ctrl-drag
Switch between Front and Back Panel Ctrl-E
Help Ctrl-H
Tiled View Ctrl-T

OVERVIEW

Part 1

You will plot two sinusoids. One of the sinusoids will have a variable frequency. These two sinusoids will be multiplied together and the product will be graphed. The FFT will also be performed on the product, and the result will also be graphed.

Part 2

Part 2 adds on to the work in part one. You will take the product of the two sinusoids and put them through a Butterworth filter. You will then connect the filter output to a formula input. The result of the formula will be graphed and then put through the FFT. The FFT result will also be graphed.

Note: All underlined commands are Right-Click commands

Additional Resource:
<http://www.iit.edu/~labview/Dummies.html>

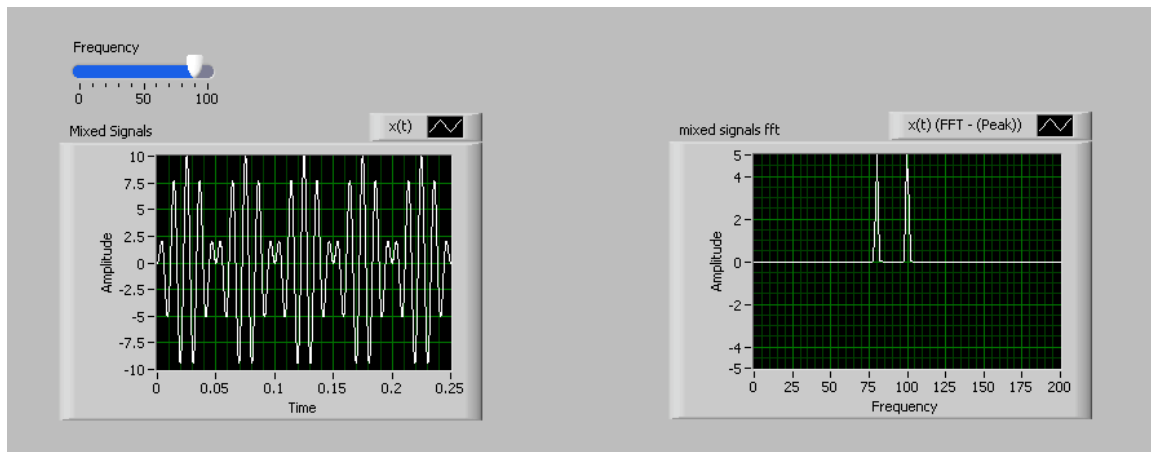
Part 1

1. Start in Back Panel
2. Insert Simulate Signal Signal Processing=>Wfm Generation=>Simulate Sig
 - a. Sine
 - b. Frequency = 10Hz
 - c. Amplitude = 1
 - d. Samples per Second = 10000
 - e. Number of Samples from Auto to 10000
 - f. Rename as x(t)
3. Insert Simulate Signal
 - a. Sine
 - b. Frequency = 100Hz
 - c. Amplitude = 10
 - d. Samples per Second = 10000
 - e. Number of Samples from Auto to 10000
 - f. Rename as y(t)
4. Go to Front Panel Ctr-E
5. Insert Numeric Slider Express=>Numeric Controls=>Pointer Slide
 - a. Right-Click=>Properties
 - b. Set Scale Range to 0-100
 - c. Change Data Range 0-100 with step=10
 - d. Change name to Frequency
6. Go to Block Diagram Ctr-E
7. Connect Slider to "Frequency" input of y(t)
8. Insert Multiplier Mathematics=>Numeric=>Multiply
9. Connect Outputs of Signals x(t) and y(t) to the Multiplier's Inputs.
10. Insert Spectral Signal Processing=>Waveform Measurements=>Spectral
 - a. Magnitude Peak
 - b. Linear
 - c. Hanning Window
11. Connect Multiplier output to Spectral Input
12. Go to Front Panel Ctr-E
13. Insert two Graphs Express=>Graph Indicators=>Graph
 - a. Name one "Mixed Signal" and the other "Mixed Signal FFT"

14. Go to Block Diagram Ctr-E
15. Connect "Mixed Signal" graph block to the output of the multiplier,
16. Connect "Mixed Signal FFT" graph block to the output of the Spectral
17. Go to Front Panel Ctr-E
18. Change Scale of "Mixed Signal FFT"
 - a. Right-Click on "Mixed Signal FFT"=>Properties=>Scales
 - b. Set X-scale to min= 0; max=200
 - c. Set Y-scale to min=-5; max=5
19. Change Scale of "Mixed Signal"
 - a. Right-Click on "Mixed Signal"=>Properties=>Scales
 - b. Set X-scale to min= 0; max=0.25
 - c. Leave Y-scale auto
20. Run Program and check Graph Outputs.
 - a. Move the frequency slider and run again to see result
 - b. Try clicking "Run Continuously" and then moving frequency slider

Sample Results for Part 1

With Frequency set to 90Hz, the results should look as follows:



Part 2

1. Go to Back Panel Ctr-E
2. Add Filter Express=>Signal Analysis=>Filter
 - a. Lowpass
 - b. Cutoff = 80Hz
 - c. Butterworth
3. Connect the multiplier output to the filter input
4. 4. Add Formula Express=>Arithmetic & Comparison=>Formula
 - a. Insert "X1+5"
5. Connect output of filter to Formula input X1
6. Insert a second Spectral with same parameters as Part 1 – Step 10
7. Connect the Output of the Formula to the input of the newly Created Spectral
8. Go to Front Panel Ctr-E
9. Insert two new Graphs Express=>Graph Indicators=>Graph
 - a. Name one "Mixed Signal After Filter" and the other "Mixed Signal FFT After Filter"
 - b. Change properties of "Mixed Signal FFT After Filter" to match properties of "Mixed Signal FFT" in Part 1 - Step 18.
 - c. Change properties of "Mixed Signal After Filter" to match properties of "Mixed Signal" in Part 1 - Step 19.
10. Go to Back Panel Ctr-E
11. Connect "Mixed Signal After Filter" graph block to the output of the formula,
12. Connect "Mixed Signal FFT After Filter" graph block to the output of the new Spectral
13. Go to Front Panel Ctr-E
14. Run Program and Check Graph Outputs for effects of filter
 - a. Move the frequency slider and run again to see result
 - b. Try clicking "Run Continuously" and then moving frequency slider

Sample Results for Part 2

With Frequency set to 90Hz, the results should look as follows:

