Engin 103 Spring '07 Meeting #24: May 1, 2007

Today we did CW#12:



As required in Project 3 specifications, the two LabVIEW applications need to include these four elements: Case Structure, For Loop, Waveform Graph, and XY Graph. An example application #1 that includes the For Loop and the Waveform Graph: VI's related to CW10 and 12, that is about plotting three or more cosines with different frequencies, with sounds, or doing spectrum detection for these signals using the FFT. An example application #2 that includes the Case Structure and the XY Graph: VI's related to CW 11, that is switching between a polynomial and an exponential fit for a same set of XY data using the Case Structure, and output data and model to a XY graph.

Possible LabVIEW applications for project 3:

- 1) Your own ideas
- 2) Circuit analysis with LabVIEW (different circuits ->ask me for equations)
- 3) An application that makes use of the Case Structure to make decisions (build upon CW#8)
- 4) An application that makes use of the For Loop (building upon CW#10) and the waveform graphs.
- 5) Adding sound to the applications that plot a function Use of To Unsign Byte Integer (under All Functions/ Numeric/Conversion),

and Snd Write Waveform (under Graphics&Sound/Sound).



Sample Block Diagram for Sound Generation: modifications needed on CW13

Demonstration of the Beat Phenomena requires selecting the right number of points

given an interval and frequencies (this is an trial-error approach to signal Processing that we can do at the introduction to engineering level).

- Plotting three or more cosine functions with different frequencies (build upon CW #12)
- 7) An application that can say the alphabet letters
- 8) An application that does data modeling (CW#11)
- 9) An application that can do experiments on noise



10) Application that can detect the frequency spectrum of a signal

Frequency Spectrum Detection: Here are the original labels of the Items we need to make a Spectrum Detection VI, not in any particular Order – elements on a same line are related,

	pr3detect.vi Block Diagram *	
	Elle Edit Operate Iools Browse Window Help Image: Strong	
	Read Waveform from File.vi	
	Path	
	Waveform Graph	
	Waveform Graph 2	
What is the mos Spectrum detec	t important element in a VI tion?	for frequency
"Path": for ergo	nomic design should we pla	ice a "Path Control"
In the Control P	anel or a "Path Constant" ir	n the Block Diagram?
Go here to downlo	bad a sample input file:	
http://www.facult	y.umb.edu/tomas_materdey/1	03s05/files/file01
If you have put to	gether the above elements cor	rectly, you should see
two groups of five	peaks each in your Waveform	Graph, this means
there were 5 freq	uency components in the origir	nal signal, the other
group is a "math s	side effect of the Fourier Trans	sform" and should be ignored

Suggested items to write in the Engin 103 logbook:

1) What did you need to do to specify the frequency of a cosine? What is the difference with respect to CW#10? Indicate what are the three inputs for each of the three bundles in CW#12. What type of graph did you use?

2) How did you produce the increment for the x-series using the initial ("between") and final ("and") values? What is the difference between the graphs for f=2Hz and f=4Hz? What are the time separations between consecutive peaks (or periods) as shown in the graphs for a frequency of 2 Hz and and a frequency of 4 Hz.? Can you tell a formula relating the period to the frequency? Explain what do you see in the graph showing the sum of both signals: can you tell the difference with respect to a signal containing only one frequency?