Engin 103 April 22, 2010 back to e-syllabus	Topics: CW12 (Cont.) CW13 Project 3 Progress Reports Logbook questions

CW 12 (Cont.)

3) Represent 0.5 in binary/digital:

a) First alternative:

Decimal system	Binary or Digital system
1	1111 1111 (255)
0.5	1000 0000 (128)

b) Second alternative: using a "binary dot"

2.5= $2 * 10^0 + 5 * 10^{-1}$ (to the right of the dot: negative powers of 10)

We can use this in binary or digital format as well: to the right of the "binary dot" use negative powers of 2:

				2	.	5			
Decimal	$0*10^3$	$0*10^2$	$0*10^1$	$2*10^0$	.	$5*10^{-1}$	$0*10^{-2}$	$0*10^{-3}$	$0*10^{-4}$
Binary	$0*2^3$	$0*2^2$	$1*2^1$	$0*2^0$	.	$1*2^{-1}$	$0*2^{-2}$	$0*2^{-3}$	$0*2^{-4}$

2.5 -> 0010.1000

back

Engineering 103 –UMass Boston

CW 13

(In-Class-Work 13)

Array, Random Number, Curve Fitting with LabVIEW

Use For Loop to generate (X,Y) data, use Random Number to add noise, use Gaussian Fit to model the data.

Goals: Generate Gaussian data series (X,Y) with random noise; perform data modeling, and plot the data and model in a same graph. The data with noise should be output in two numeric arrays, the Gaussian model parameters should be output in three numeric indicators

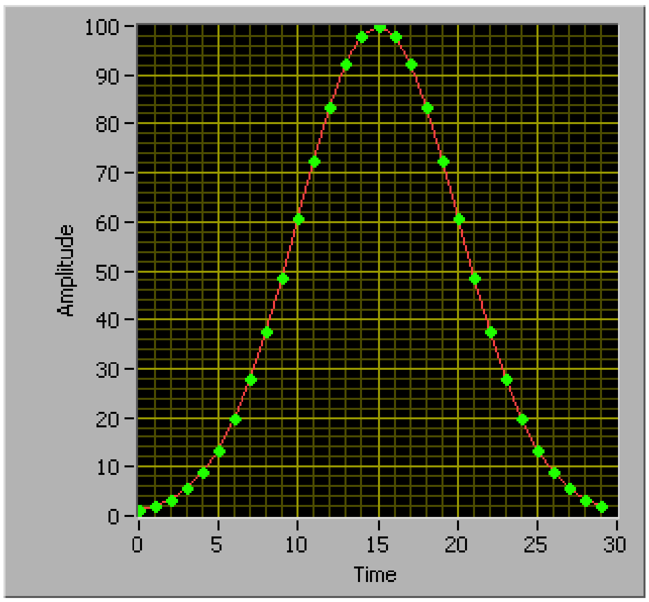
Please insert names and dates within the Front Panels. In each team, students working together at a computer numbered between 1 and 10 will submit LabVIEW LLB file

cw13_XX_a.llb, students working at a computer numbered between 11 and 20 will submit LabVIEW LLB file cw13_XX_b.llb, to the *files* folder in the server. Replace XX by 01 if team 1, etc. These files need to be uploaded to the server today to receive credit. **Include your names within the files.**

*Remember that this is an individual work (turn it in, as instructed, with your name and date). Home-works and class-works count 20% toward the course grade. Class-works are done in class.

Gaussian Signals

XY Graph



Gaussian function: $y = A * e^{-\frac{(x-\bar{x})^2}{2\sigma^2}}$

A= the amplitude (100 in the figure above)

$\bar{x}$= the mean value (also the center since the Gaussian function is symmetric, 15 in the figure above)

σ = the standard deviation (half width of the Gaussian when the amplitude is decayed to A/e, 5 in the figure above)

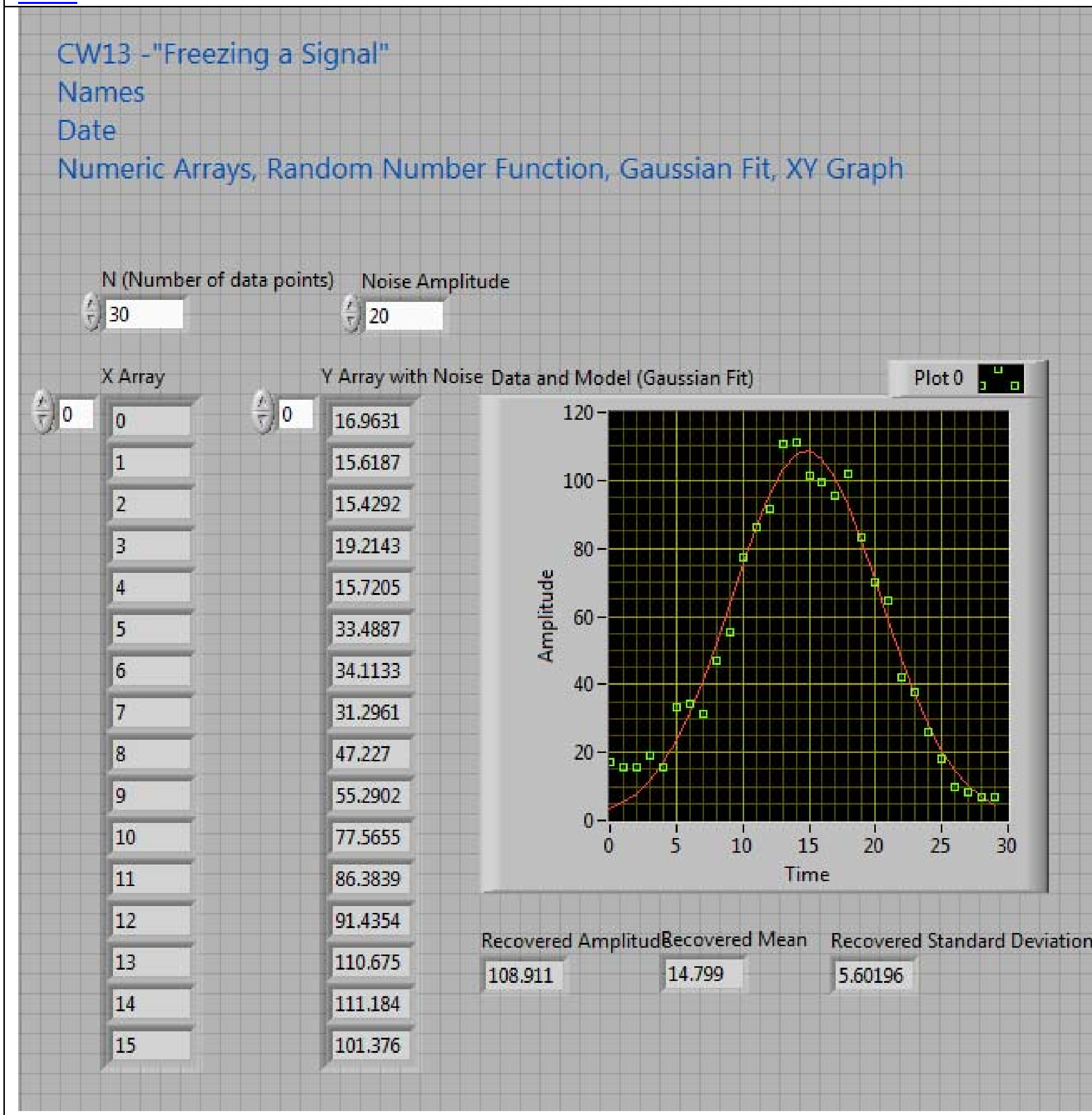
back

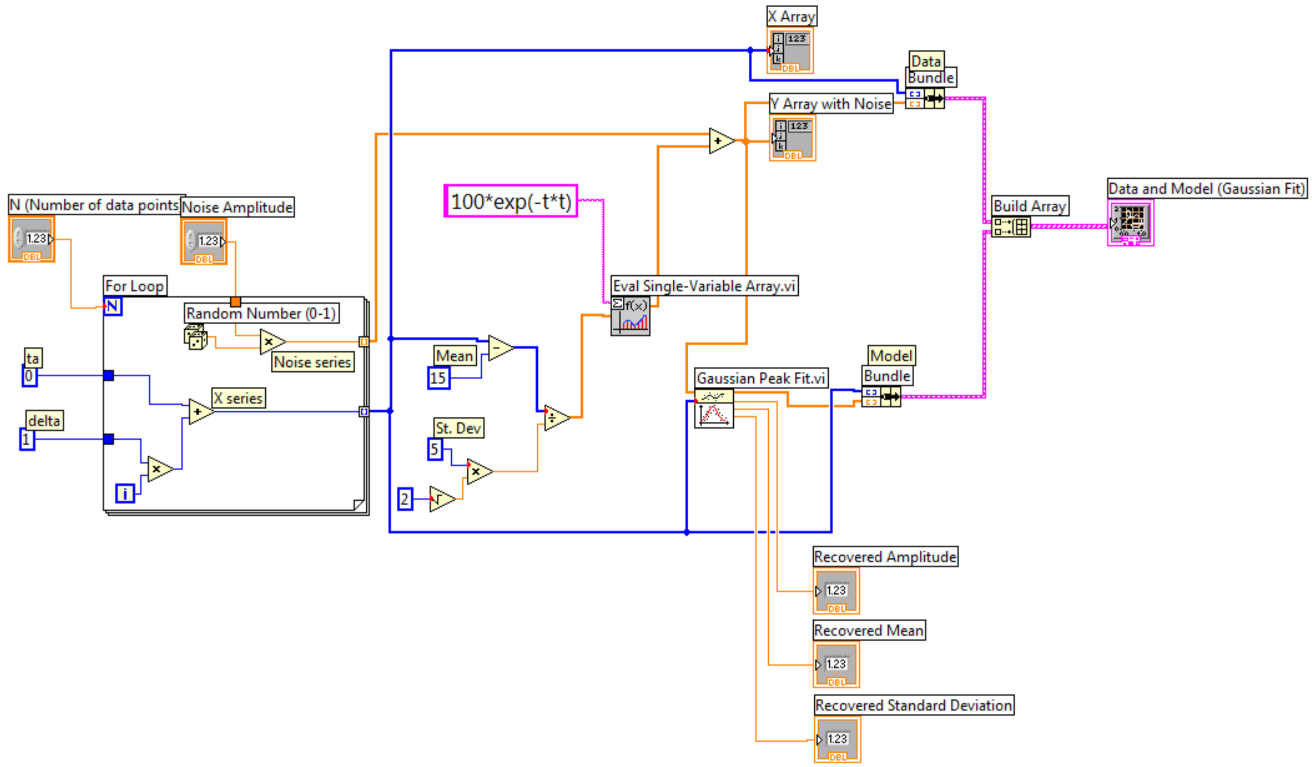
LabVIEW VI implementation:

1) Generate X series (N points) using a For Loop
2) Generate random noises using Random Number function
3) Generate the Gaussian function using an Eval Single-Variable Array, with appropriate mean and standard deviation
4) Output (X,Y) into numeric arrays
5) Use Gaussian Fit to do a curve fitting on this data

6) Plot data and model (Gaussian Fit) using an XY Graph

back





Project 3 Progress Report

Project 3 leaders: please copy this document and fill in your team response below. Then save as a web page: name “p3pr.html” and upload to your *FTP files* folder. This Progress Report **is required as** part of Project 3 on LabVIEW Virtual Instruments, it is due today

Section 1 (9:30 AM)

Team #	**1) Describe the project you are implementing** **2) Describe what will be the inputs and outputs and what LabVIEW elements will be used to implement those.**	**1) Describe the algorithm (steps to follow to produce the outputs from the inputs) and what LabVIEW operations or sub-VI’s will be used.** **2) Describe any difficulty you anticipate in implementing this algorithm**	**Assign a grade on communication in your team in this project:** **4 –members always communicate how they are doing on their part** **3 – members sometimes communicate how they are doing on their part** **2- some member does not reply emails or phone calls** **1 – members show no interest in participating**
1 section 1			
2 section 1			
3 section 1			

4 section 1			
5 section 1			
6 section 1			
7 section 1			
8 section 1			
9 section 1			
10 section 1			

Section 2 (2:00 PM)

Team #	1) Describe the project you are implementing 2) Describe what will be the inputs and outputs and what LabVIEW elements will be used to implement those.	1) Describe the algorithm (steps to follow to produce the outputs from the inputs) and what LabVIEW operations or sub-VI's will be used. 2) Describe any difficulty you anticipate in implementing this algorithm	Assign a grade on communication in your team in this project: 4 –members always communicate how they are doing on their part 3 – members sometimes communicate how they are doing on their part 2- some member does not reply emails or phone calls 1 – members show no interest in participating
1 section 2			
2 section 2			
3 section 2	1)	1)	
4 section 2			
5 section 2			
6 section 2			
7 section 2		1)	
8 section 2			
9 section 2			
10 section 2			

back

LOGBOOK: example of a logbook page

-Use a quadrille notebook; number all pages; date all entries
-Write your notes for all activities, thoughts, problems and solutions, and learning conclusions related to Engin 103. You should write down progress, outcomes, and conclusions on projects and teamwork; conclusions from class work (including LabVIEW) and homework.
-In addition you should answer in the logbook all questions listed in these notes in blue, as shown below:

47) a) Binary numbers: write 0.625 and 0.875 using 8 bit binary numbers with a "binary dot" between the two groups of four bits. b) Can you write 0.626 using 8 bits with four bits after the dot? Explain if we could achieve exact calculations using a digital computer. Can you offer a solution?

48) What are the information required by an XY Graph? What did we use the 'Build Array' for? Specify the LabVIEW version you are using and describe how to insert an "Array" of 'Numeric Controls" in the Front Panel. Also where to find the 'Gaussian Peak Fit.vi' and what inputs and outputs we are using in this exercise.

49) Explain why did we use a Gaussian Peak Fit to model the data stored in numeric arrays X and Y (with noise), instead of choosing Linear Fit, or Polynomial Fit.

50) What was the Signal Amplitude as specified in the Block Diagram above? Explain what happens to the Recovered Amplitudes, Mean, and Standard Deviation when the Noise Amplitude is decreased from 20% of the Signal Amplitude down to 1%?

back