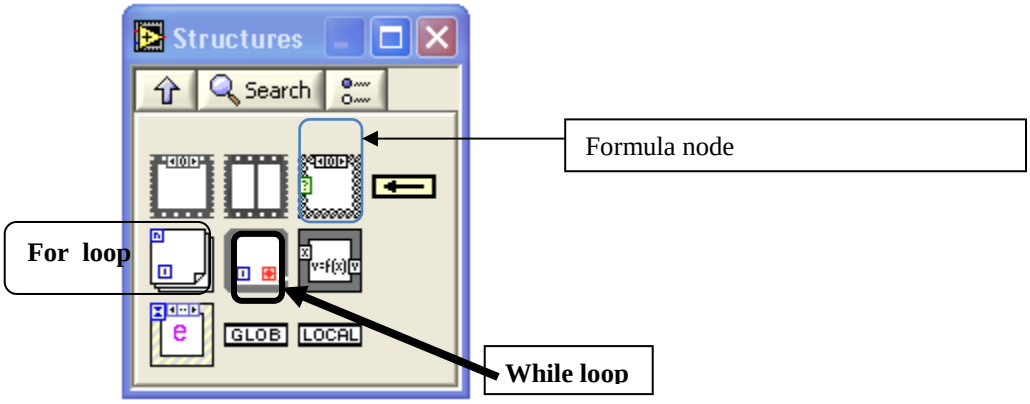
PHY 651 – LABORATORY 2

Laboratory Goals

- You will familiarize yourself with more tools in labview programming. In particular:
  - You will learn other structures in labview. During the first laboratory you learned about the While loop, now you will experiment with the FOR loop
  - You will manipulate Arrays and Clusters (more complex data arrays).
  - You will learn how to visualize your data with graphs and charts.
- Check chapters 2 and 3 of the textbook for the definitions of structures that are relevant to your work:
  - the function family STRUCTURES, that give you a variety of choices for recursive algorithms.



Two structures will be useful to you: the WHILE loop, which repeats the set of instructions up to N times, and the FOR loop, that repeats the set of instructions as long a logical condition is true.

- You will learn to aggregate entities of different dimension (e.g. arrays and multiplicative constants with the bundle function in the array/cluster function group.

- You will learn to visualize data with WAVEFORM GRAPHS AND XY GRAPHS & print your results with ARRAY INDICATORS.

- You will learn to use the formula node to enter equations in a "mathscript" form. Note: this version of Labview does not contain the Tool mathscript, so you will have to do with what you have.

- Another difference between the Labview described in your book and the one that you are using is the fact that to introduce a scale function in the x and y axes you have to use the pull down menu that you can activate by right-clicking on the x or y axis and then select x or y scale.

ACTIVITY 1

Follow the textbook example to construct a sine wave plot using a waveform graph and a for loop. Be sure that you understand the concept of "auto-indexing" and how to turn it on and off. Also implement the x-axis calibration both through a change of the x-axis scale and through the use of the bundle function.

ACTIVITY 2

Do problem 2 on page 76. In order to answer part (b) create an indicator that displays the fractional change difference between asymptotic value and truncated series value. Note that the logarithmic function group, where you will find x^n, is part of the numeric palette.

ACTIVITY 3

Do problem 7 on page 79. Put an additional feature: calculate the standard deviation of this array of numbers and compare it with your expectations for the standard deviation of a uniform distribution of numbers between 0 and 1.

ACTIVITY 4

Generate a VI where you can input the variable x and get out the variable y=1+2x^2+3x^3. (I would suggest to use the formula node, but you can also do it with the numeric function x^y, maybe you can do both to find out whether you like better graphical programming or the standard text based programming),

ACTIVITY 5

Generate a sine wave plot using the formula node structure (note that the right syntax for your expressions will require to declare the output variable type and to end each statement with a semicolon) and the xy graph (you can refer to chapter 3 for details).