Engin 103 Spring '07 Meeting #17: April 3, 2007

Today we worked on the Circuit Analysis with LabVIEW III: the equations for wiring in the Block Diagram are shown in the link to this lab in the e-syllabus.

In this exercise we make a graphical program with LabVIEW using a set of four equations that are provided below. These equations solve the particular circuit shown in the Front Panel insert, in which there are seven inputs: V (the battery voltage); and R1 through R6 (six resistances); and four outputs: I (the total current); V2; V4; and V6 (voltages across corresponding resistances as shown in figure):

$$I = \frac{V}{R1 + R2 \| \{R3 + [R4\| (R5 + R6)]\}} = \frac{V}{R1 + \frac{R2 \cdot \{R3 + \frac{R4 \cdot (R5 + R6)}{R4 + R5 + R6}\}}{R2 + R3 + \frac{R4 \cdot (R5 + R6)}{R4 + R5 + R6}}$$
(1)

$$V2 = V - I \cdot R1 \tag{2}$$

$$V4 = V2 - \left(I - \frac{V2}{R2}\right) \cdot R3 \tag{3}$$

$$V6 = V4 - \left(I - \frac{V2}{R2} - \frac{V4}{R4}\right) \cdot R5 = \left(I - \frac{V2}{R2} - \frac{V4}{R4}\right) \cdot R6$$
(4)

Step3: continue on implementing equation (1) to produce the intermediate variable RB -The comment can be inserted as a Text Box (letter "A" within the Tools Palette) -Font color can be changed under "Application Font/Color"





Step 7: Check! These numbers can be obtained manually by setting V=9V; R1 to R6=1 Ohm You should them get I=5.54; V2=3.46; V4=1.38; V6=0.69 (note I use 2 decimal digits, this can Be change by right click on the icon, select Format/Precision, select 2 decimal digits).



Suggested items to write in the Engin 103 logbook:

1) By looking at the equation (1) to obtain the total current I in the link to Circuit Analysis with LabVIEW III in the e-syllabus, indicate what group of operations are repeating, how many times? Attach a print-out of the Block Diagram of your VI here and circle these groups.

 Is there any repeating pattern in the equations (2) to (4) to obtain V2, V4, V6? Explain. Attach a print-out of the Block Diagram of your VI and circle the group of operations leading to V2, V4, and V6, respectively.