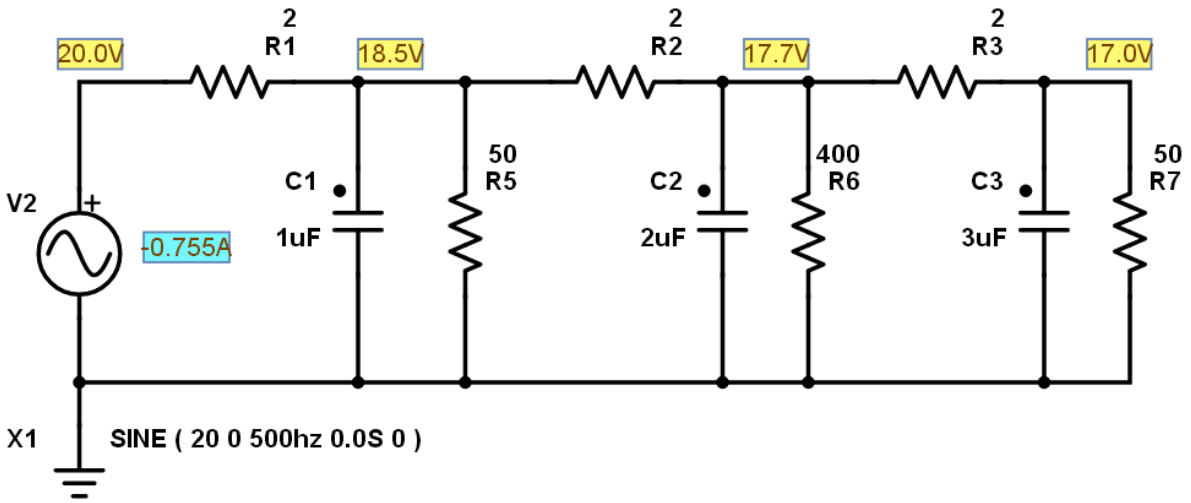
EE 206: Homework #1 Solution

PartSim and Matlab: Due Wednesday, January 22nd

PartSim

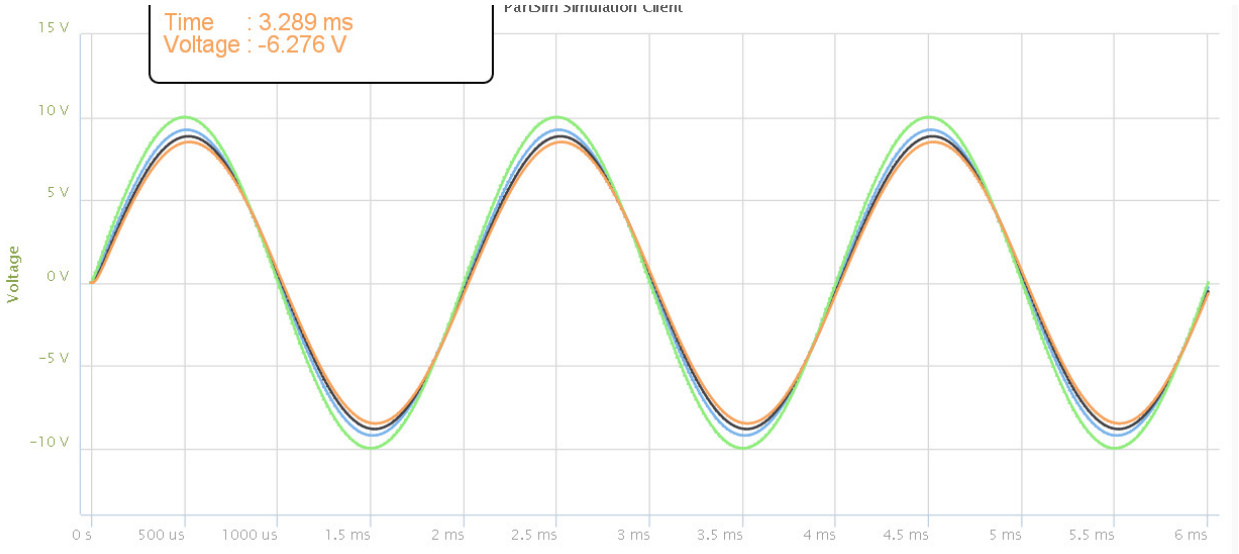
1) For the following circuit, let Vo = 20V. Using PartSim, determine the voltages V1 .. V3. (note: use Run - DC Bias)



2) Assume Vo is a

- 500Hz sine wave
- 10V peak

Determine the voltages V1..V3 for 5ms (use Run - Transient Response)



Matlab

3) Using Matab, solve for V_1, V_2, and V_3

$$8V_1 + 9V_2 + 3V_3 = 50$$

$$9V_1 + 6V_2 + 5V_3 = 0$$

$$V_1 + V_2 + 10V_3 = 7$$

Place this in matrix form

$$\begin{bmatrix} 8 & 9 & 3 \\ 9 & 6 & 5 \\ 1 & 1 & 10 \end{bmatrix} \begin{bmatrix} V_1 \\ V_2 \\ V_3 \end{bmatrix} = \begin{bmatrix} 50 \\ 0 \\ 7 \end{bmatrix}$$

Solve using Matlab

```
A = [8,9,3 ; 9,6,5 ; 1,1,10]

     8.     9.     3.
     9.     6.     5.
     1.     1.     10.

B = [50 ; 0 ; 7]

     50.
     0.
     7.

V = inv(A)*B
```

V1 -9.3006329
V2 13.737342
V3 0.2563291

4) Using Matab, solve for V_1, V_2, and V_3

$(8+j10)V_1 + 9V_2 + 3V_3 = 50$

$9V_1 + (6+j5)V_2 + 5V_3 = 0$

$V_1 + V_2 + (10+j9)V_3 = 7 + j7$

Place in matrix form

$$\begin{bmatrix} 8+j10 & 9 & 3 \\ 9 & 6+j5 & 5 \\ 1 & 1 & 10+j9 \end{bmatrix} \begin{bmatrix} V_1 \\ V_2 \\ V_3 \end{bmatrix} = \begin{bmatrix} 50 \\ 0 \\ 7+j7 \end{bmatrix}$$

Solve using Matlab

```
A = [8+j*10, 9, 3 ; 9, 6+j*5, 5 ; 1,1,10+j*9]

    8. + 10.i    9.           3.
    9.           6. + 5.i     5.
    1.           1.           10. + 9.i

B = [50 ; 0 ; 7 + j*7]

    50.
    0
    7. + 7.i

V = inv(A)*B

V1  -0.1238631 - 3.0928242i
V2   2.0148483 + 2.8378738i
V3   0.6430094 + 0.1467866i
```