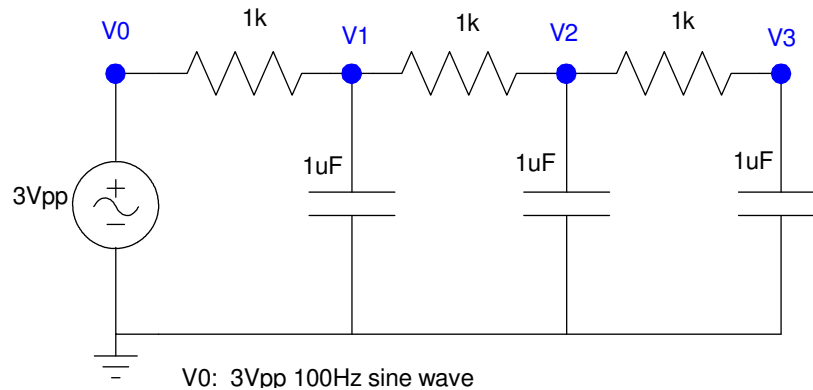


ECE 211: Homework #7

Phasors & Voltage Nodes / Current Loops / Max Power

Phasors & Voltage Nodes



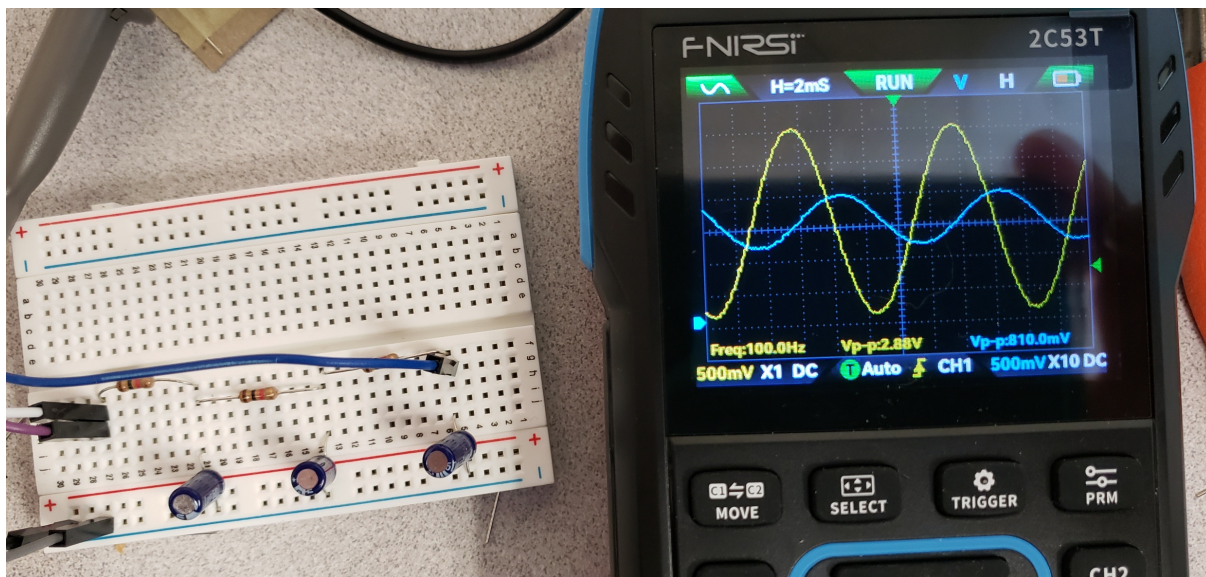
Problems 1-6

- 1) Write the voltage node equations for the given RC circuit. Assume V0 is a 3Vpp 100Hz sine wave

$$V_0 = 1.5 \sin(628t)$$

- 2) Solve for the voltages {V1, V2, V3}
- 3) Simulate this circuit using CircuitLab. Find the voltages at {V1, V2, V3}
 - Both magnitude and phase

Lab:



Lab: Example of what your circuit might look like and measurements with your FNRIS meter

Lab

4) Build this circuit using your lab kit.

- Set V0 to be a 3Vpp 100Hz sine wave using your FNRSI meter
- Include a photo in your homework set

5) Measure the voltages at {V0, V1, V2, and V3} using your FNRSI multimeter

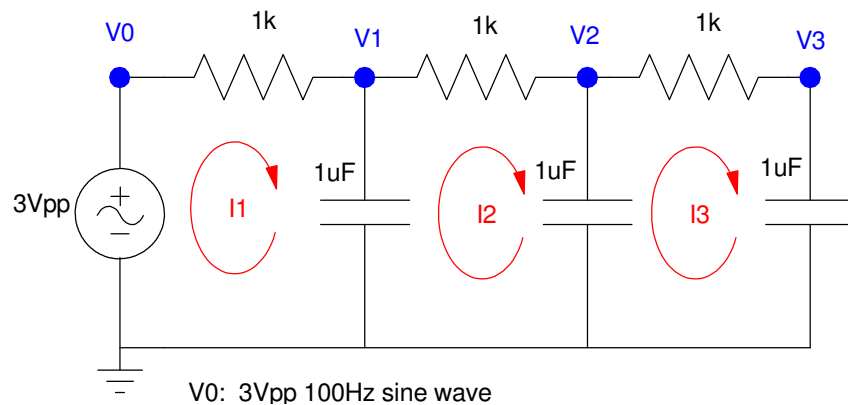
- AC voltages
- note: Readings will be rms voltage

$$V_{rms} = \left(\frac{1}{\sqrt{2}}\right) V_p = \left(\frac{1}{2\sqrt{2}}\right) V_{pp}$$

6) Measure the voltages at {V0, V1, V2, and V3} using your FNRSI oscilloscope

- Both amplitude & phase
- Treat the zero crossing for V0 as t=0 (V0 is a sine wave)

Phasors & Current Loops



Problems 7-12

7) Write the current loop equations for the given RC circuit. Assume V0 is a 3Vpp 100Hz sine wave

$$V_0 = 1.5 \sin(628t)$$

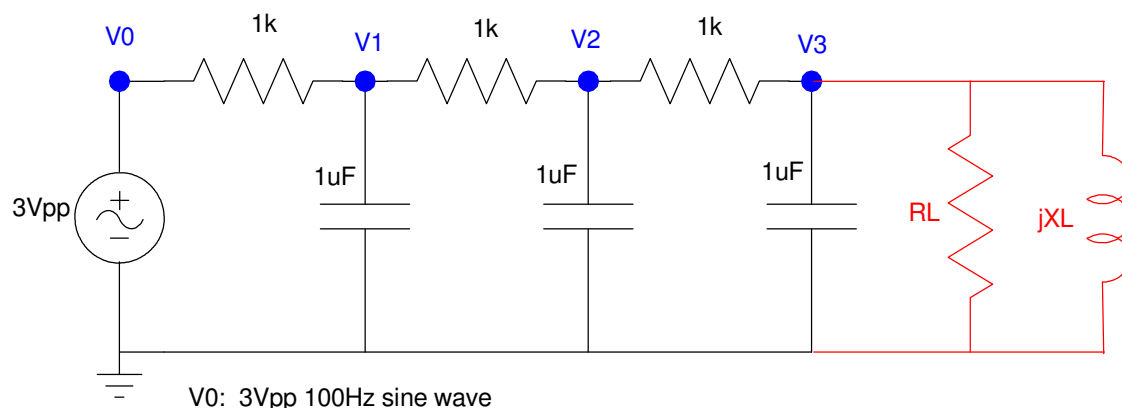
8) Solve for the currents {I1, I2, I3}

9) Simulate this circuit using CircuitLab. Find the currents {I1, I2, I3}

- Both magnitude and phase

Max Power Transfer

10) Find R_L and jX_L to maximize the power to the load



Problem 10