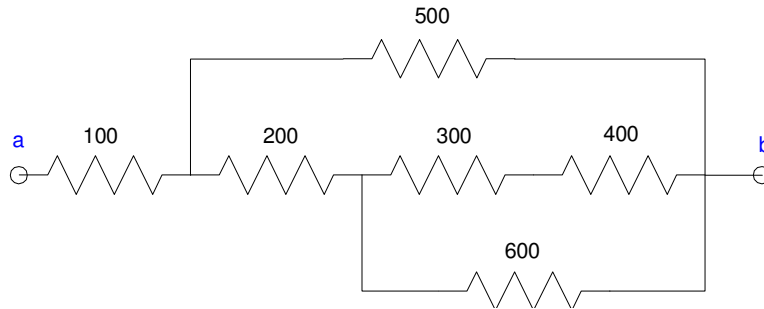


ECE 320 - Homework #1

ECE 211 Review, Phasors, 555 Timers

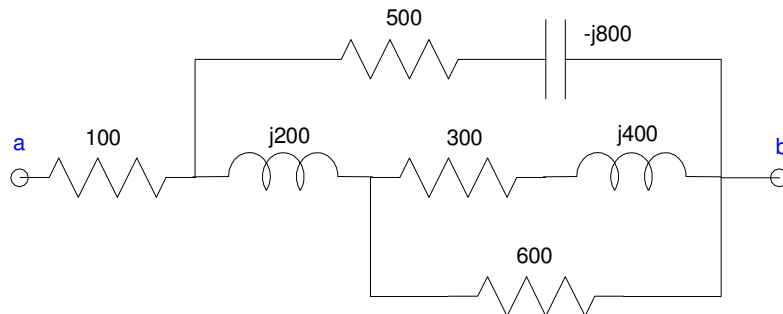
Resistors in series and parallel

1) Find the resistance R_{ab}



Problem 1

2) Find the impedance, Z_{ab}

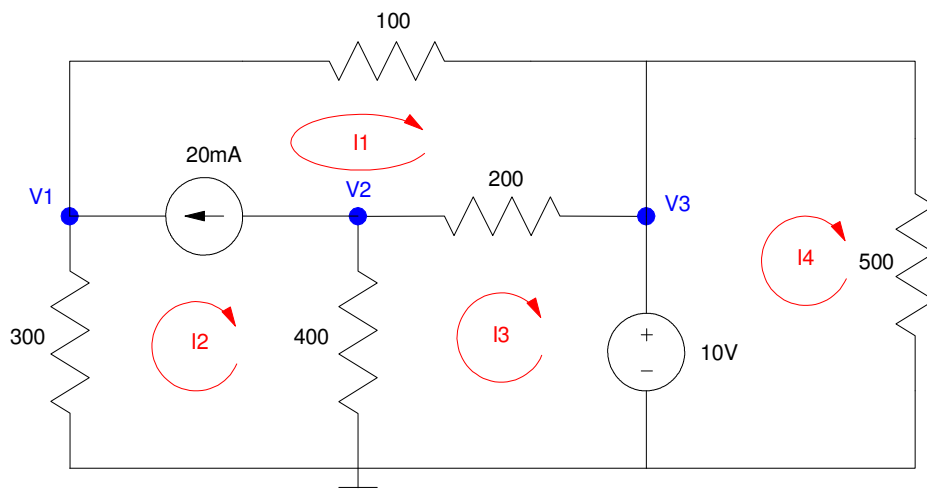


Problem 2

Voltage Nodes & Current Loops

3) Write the voltage node equations for the following circuit (you don't need to solve)

4) Write the current loop equations for the following circuit (you don't need to solve)



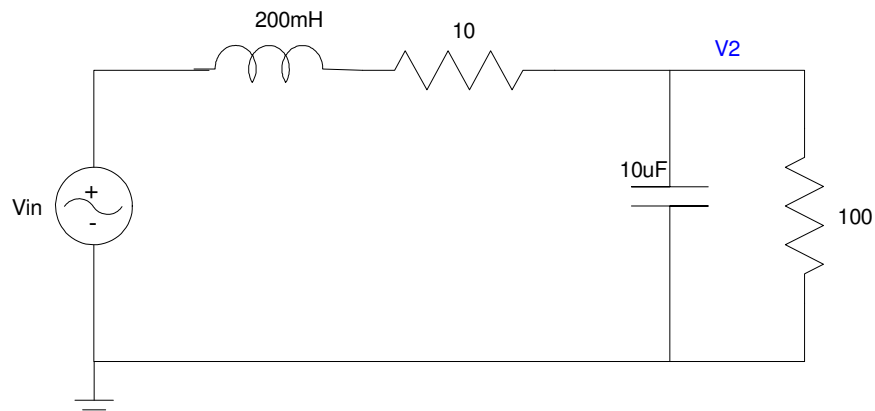
Problem 3 & 4

Phasors & Superposition

Assume V_{in} contains a DC and 400 rad/sec (63.66Hz) signal:

$$V_{in} = 10 + 2 \cos(500t) + 6 \sin(500t)$$

- 5) Determine the voltage V_2 using phasor analysis
 - Both the DC and AC term
- 6) Determine the voltage V_2 using CircuitLab
 - Compare CircuitLab's results to your calculations in problem #5

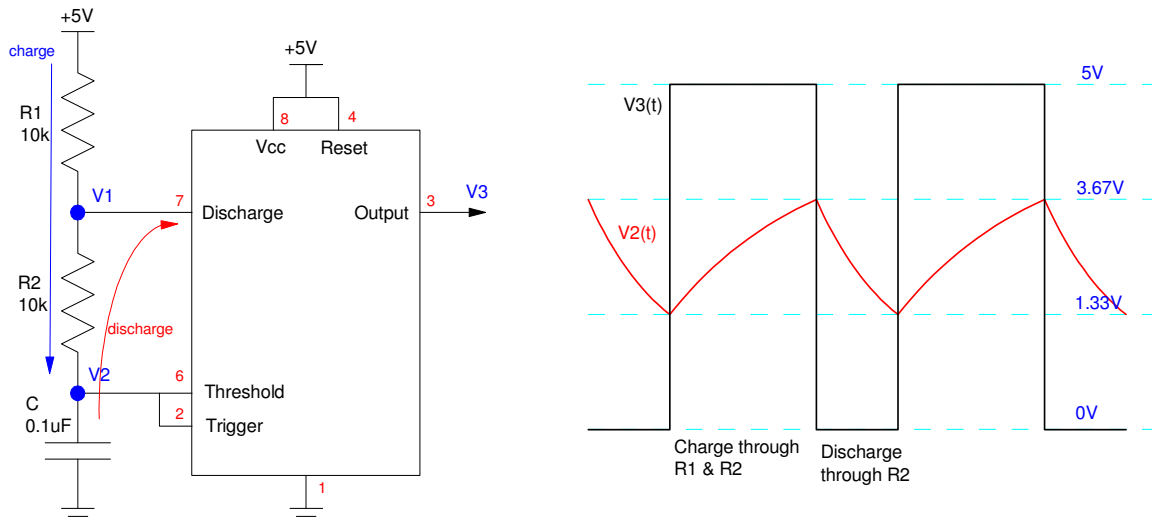


Problem 5-6

Lab (over)

Lab

- 7) Using your FNRSI multimeter, measure the resistance of R1, R2, and C (two 10k resistors and a 0.1uF capacitor)
- 8) Build the following 555 timer circuit with your lab kit
 - Include a photo of your breadboard circuit for full credit
- 9) Using your FNRSI multimeter in oscilloscope mode, record the signal at
 - Pin 3 (Output - a square wave), and
 - Pin 6 (Threshold - a charge / discharge waveform)
 - Include a photo of the signal on your multimeter



Problems 7-9. $T = (2 \cdot R1 + R2) \cdot C \cdot \ln(2)$



Sample of what your circuit and reading might look like

Note

- Use the 5V power supply for your breadboard (black circuit to the right)
 - +5V (red rail) and ground (blue rail)
- Color code your wires
 - red = +5V
 - black = ground
- Keep the circuit neat. Saves a lot of time debugging.