**Lab Report: 209L – 01 Ngyuen**

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**Experiment 7**

**Power Measurements**

**Objectives:** to measure and calculate the power dissipation in a RLC circuit

**Equipment’s Used:**

* Oscilloscope
* AC Voltage Generator
* Multimeter
* Capacitor-Inductor Meter
* Clip leads
* BNC Cables
* Inductor
* Resistors
* Capacitors

**Prelab:**

Attached at end of the report.

**Lab:**

Nominal value of resistor 1 = 865.0 Ω

Nominal value of resistor 2 = 10.0 Ω

Measured value of resistor 1 = 858.74 Ω

Measured value of resistor 2 = 11.76 Ω

%difference =

Nominal Value of Inductor = 0.1H

Nominal capacitor value = 0.1 uF

Measured capacitor value = 0.103 uF

%difference =

Value of Capacitor more than 10 times greater than C = 1.66 uF

Value of Capacitor more than 10 times smaller than C = 0.0098 uF

Table 1: Measurement of parts

|  |  |  |  |
| --- | --- | --- | --- |
|  | Measured | Nominal | %difference |
| Resistor 1 | 858.74 Ω | 865 Ω | -0.72% |
| Resistor 2 | 11.74 Ω | 10 Ω | 17.6 % |
| Inductor | n/a | 0.1 H | n/a |
| Capacitor 1 | 0.103nF | 0.1uF | 3% |
| Capacitor 2 | 1.66 uF | > 0.1uF \* 10 | n/a |
| Capacitor 3 | 0.0098 uF | < 0.1uF / 10 | n/a |

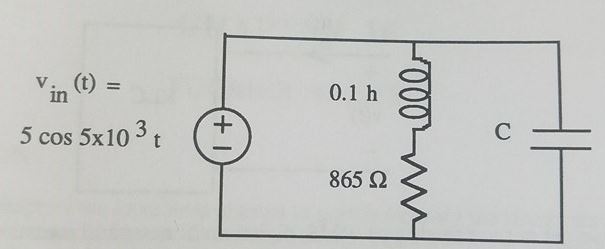


Figure 1: Circuit 1 drawn in lab manual

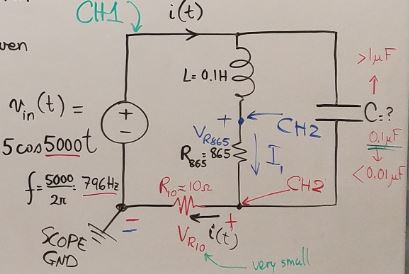
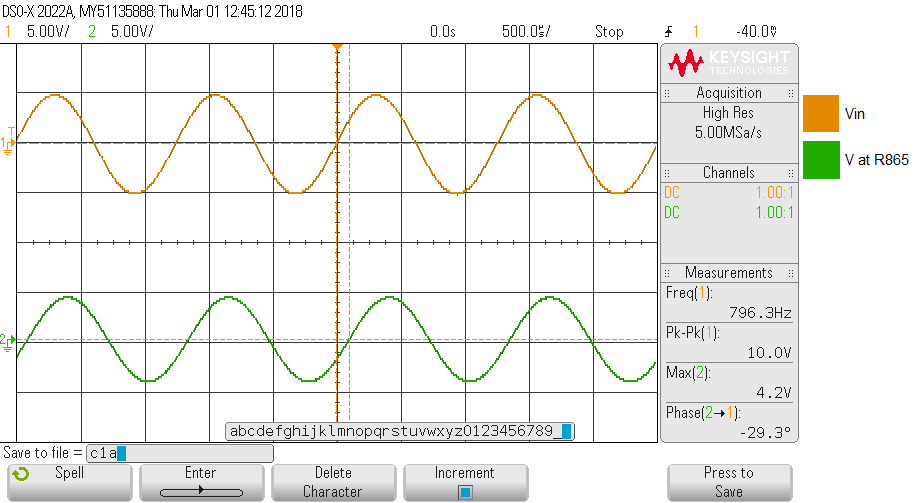


Figure 2: Circuit 1 drawn by our Professor

Calculation for Capacitor 1 = 0.1uF

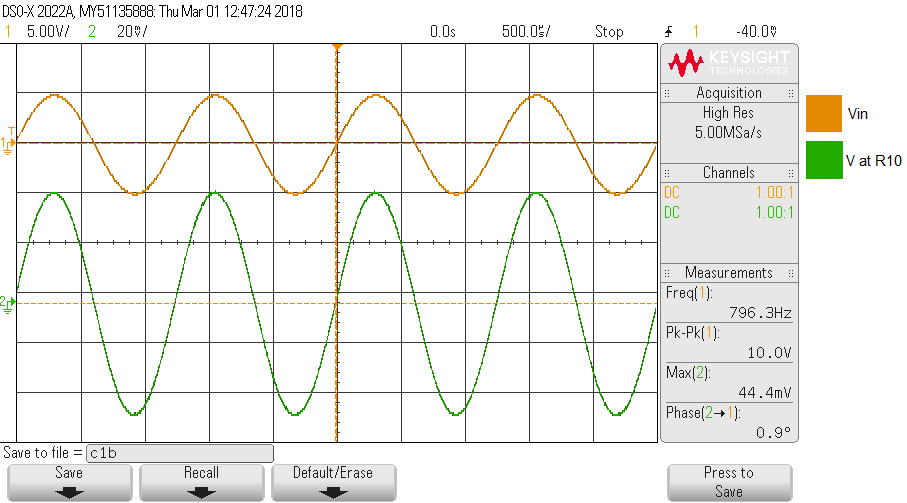
Voltage used = 10Vpp  
Frequency used = 5000/2π = 796Hz

Using Frequency domain,



Graph 1: Measurements of Vin(t) and VR865t) at F = 796HZ, C = 0.1uF

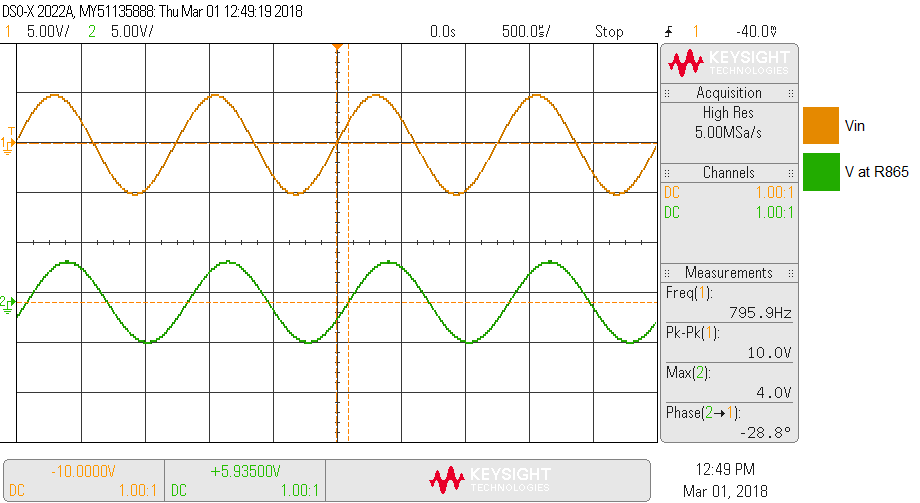
Vin(t) = 10.0Vpp, Vr865(t) = 4.2Vpp, Voltage Phase = -29.3°



Graph 2: Measurements of Vin(t) and VR10(t) at F = 796HZ, C = 0.1uF

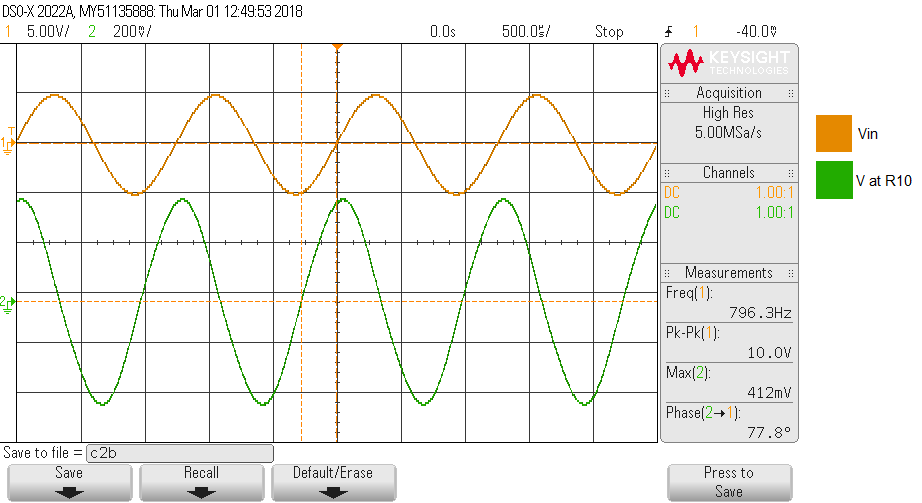
Vin(t) = 10.0Vpp, Vr10(t) = 44.4mVpp, Voltage Phase = 0.9°

Calculation for C 10 times greater than 0.1uF



Graph 3: Measurements of Vin(t) and VR865t) at F = 796HZ, C = 1.66uF

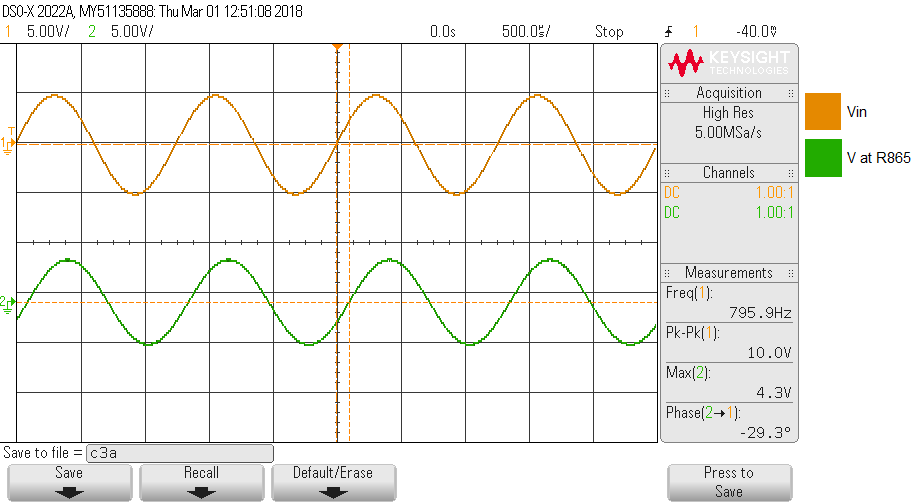
Vin(t) = 10.0Vpp, Vr865(t) = 4.0Vpp, Voltage Phase = -28.8°



Graph 4: Measurements of Vin(t) and VR10(t) at F = 796HZ, C = 1.66uF

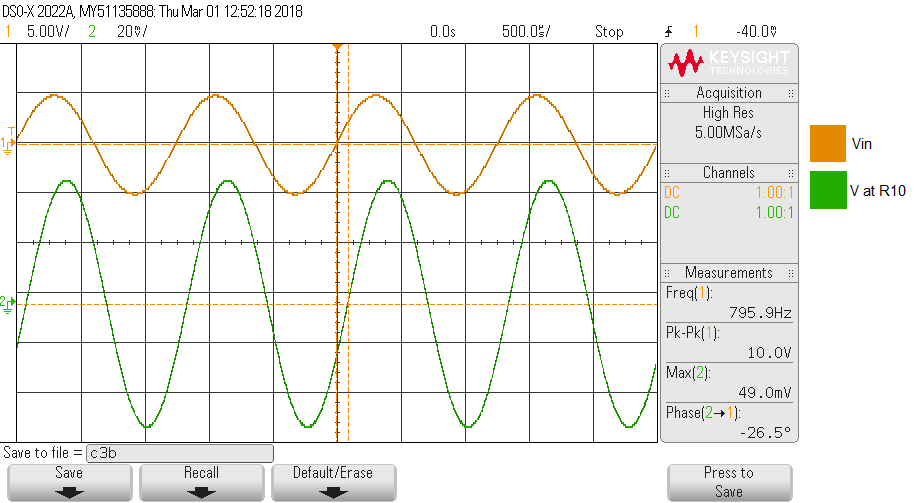
Vin(t) = 10.0Vpp, Vr10(t) = 412mVpp, Voltage Phase = 77.8°

Calculation for C 10 times smaller than 0.1uF



Graph 5: Measurements of Vin(t) and VR865t) at F = 796HZ, C = 0.0098uF

Vin(t) = 10.0Vpp, Vr865(t) = 4.3Vpp, Voltage Phase = -29.3°



Graph 6: Measurements of Vin(t) and VR10(t) at F = 796HZ, C = 0.0098uF

Vin(t) = 10.0Vpp, Vr10(t) = 49.0mVpp, Voltage Phase = -26.5°

Table 2: Summary of Graph

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| C (uF) | F (hz) | Vin (Vpp) | Vr865 (Vpp) | Vr10 (Vpp) | Phase at R10 |
| 0.1 | 796 | 10 | 4.2 | 0.044 | 0.9° |
| 1.66 | 796 | 10 | 4.0 | 0.412 | 77.8° |
| 0.0098 | 796 | 10 | 4.3 | 0.049 | -26.5° |

**Post Lab:** Attached at end of lab report