Lab 3 – Results: Intro to AC Circuits

*ECE209: Fundamentals of Electrical Engineering*

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| --- | --- | --- |
| Name | Student ID | CCID |
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|  |  |  |

## 2.1.3 Capacitance (DMM)

|  |  |  |  |
| --- | --- | --- | --- |
| 1. **DMM**
 | 1. **C1uF**
 | 1. *(nF)*
 |  |
| 1. **C220nF**
 | 1. *(nF)*
 |  |
| 1. **C100nF**
 | 1. *(nF)*
 |  |

## 2.1.4 AC Voltage (DMM)

|  |  |  |
| --- | --- | --- |
| **AD2 Wavegen** | **DMM** *(V AC)* | **AD2 Voltmeter** *(AC RMS)* |
| **1VPeak @ 100Hz** |  |  |
| **2VPeak @ 200Hz** |  |  |
| **3VPeak @ 500Hz** |  |  |

# 2.2 **Resistor Circuit**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 3VPeak@500Hz | **R** | ***(Ω)*** | **220** | **470** | **1500** |
| **DMM** | **R** | (*Ω)* |  |  |  |
| **IRMS** | *(mA)* |  |  |  |
| **Scope** | **VMAX** | *(V)* |  |  |  |
| **VMIN** | *(V)* |  |  |  |
| **VAVG** | *(mV)* |  |  |  |
| **VPeak2Peak** | *(V)* |  |  |  |
| **VRMS** | *(V)* |  |  |  |
| **f** | *(Hz)* |  |  |  |
| **period** | *(mS)* |  |  |  |
| **IRMS** | *(mA)* |  |  |  |
| **Calcs** | **R** | *(Ω)* |  |  |  |

# 2.3 Series Resistors

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 3VRMS | **f** | ***(Hz)*** | **100** | **1000** | **10000** |
| **DMM** | **fS** | *(Hz)* |  |  |  |
| **Scope** | **VR1RMS** | *(V)* |  |  |  |
| **VR2RMS** | *(V)* |  |  |  |
| **VSRMS** | *(V)* |  |  |  |
| **ISRMS** | *(mA)* |  |  |  |
| **Calcs** | **R1** | *(Ω)* |  |  |  |
| **R2** | *(Ω)* |  |  |  |

# 2.4 Series RC (1uF)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 3VRMS | **f** | ***(Hz)*** | **100** | **338.6** | **1000** | **10000** |
| **DMM** | **fS** | *(Hz)* |  |  |  |  |
| **Scope** | **VR1RMS** | *(V)* |  |  |  |  |
| **VC1RMS** | *(V)* |  |  |  |  |
| **VSRMS** | *(V)* |  |  |  |  |
| **ISRMS** | *(mA)* |  |  |  |  |
| **Calcs** | **R1** | *(Ω)* |  |  |  |  |
| **XC1** | *(Ω)* |  |  |  |  |
| **C1** | *(nF)* |  |  |  |  |

# 2.5 Series RC (100nF)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 3VRMS | **f** | ***(Hz)*** | **100** | **1000** | **3386** | **10000** |
| **DMM** | **fS** | *(Hz)* |  |  |  |  |
| **Scope** | **VR1RMS** | *(V)* |  |  |  |  |
| **VC2RMS** | *(V)* |  |  |  |  |
| **VSRMS** | *(V)* |  |  |  |  |
| **ISRMS** | *(mA)* |  |  |  |  |
| **Calcs** | **R1** | *(Ω)* |  |  |  |  |
| **XC2** | *(Ω)* |  |  |  |  |
| **C2** | *(nF)* |  |  |  |  |

# **2.6 Series RL (10mH)**

|  |  |  |  |
| --- | --- | --- | --- |
| **DMM** | **R10mH** | *(Ω)* |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 3VRMS | **f** | ***(Hz)*** | **100** | **1000** | **7480** | **10000** |
| **DMM** | **fS** | *(Hz)* |  |  |  |  |
| **Scope** | **VR1RMS** | *(V)* |  |  |  |  |
| **VL1RMS** | *(V)* |  |  |  |  |
| **VSRMS** | *(V)* |  |  |  |  |
| **ISRMS** | *(mA)* |  |  |  |  |
| **Calcs** | **R1** | *(Ω)* |  |  |  |  |
| **XL1** | *(Ω)* |  |  |  |  |
| **L1** | *(mH)* |  |  |  |  |

# **Impedance-Frequency** Plot

The following pages have been left for you to include the plots that you are required to create as part of your post-lab.

To create your plots you can use whichever software you would like (Excel, Matlab, etc), export your plot as an image and import it into your Lab 3 - Results sheet in the appropriate place.

Your plots should include:

* A Plot title
* Label your axes and show what unit of measure is used.
* Include a marking for your data-points.
* Include a line between your data-points in the same series.
* Include a legend.
* Make sure your scales are appropriate and visible.

< Insert your plot here >

For the 5 components used in the 4 series circuits: 220Ω, 470Ω, 1uF, 100nF and the 10mH,

 Plot each components impedance vs. frequency on the same plot. Use a logarithmic scale for both the x-axis and y-axis.