LAB RECORD **(Weight: 30 %)**

Phasor relation & Z determination : Figure 3.6, Steps 1 to 3

R = ……………Ω., R_p= …………… Ω.

Nominal value of C = 220 nF ,

Measured value of C on RLC-meter = …………nF @ 1kHz

From the printout

Ch1 voltage V_1 = ………………Volts RMS

Ch2 voltage V_2 = ………………Volts RMS

Ch1 Frequency f = ……………Hz

Time-shift between V_1 & V_2, Δt =……………μs

Figures 3.9 , Steps 4 to 6:

RLC-meter measured values (all @ 1kHz):

r = ……………. Ω L = …………mH, C = …………nF, R=………..Ω

Resonant frequency $f_o \approx$ ………… Hz

From the printout at **frequency** f_1 **:**

Ch1 voltage V_1 = ………………Volts RMS

Ch2 voltage V_2 = ………………Volts RMS

Ch1 Frequency f = f_1 **=** … ……………Hz

Time-shift between V_1 & V_2, Δt =……………μs

From the printout at **frequency** f_2 **:**

Ch1 voltage V_1 = ………………Volts RMS

Ch2 voltage V_2 = ………………Volts RMS

Ch1 Frequency f = f_2 **=** ……………Hz

Time-shift between V_1 & V_2, Δt =……………μs

TA signature:…………………………….

Figure 3.12 , Step 7 :

From the printout at **frequency** f **=** …………Hz

Ch1 voltage V_1 = ………………Volts RMS

Ch2 voltage V_2 = ………………Volts RMS

Ch1 Frequency f = ……………Hz

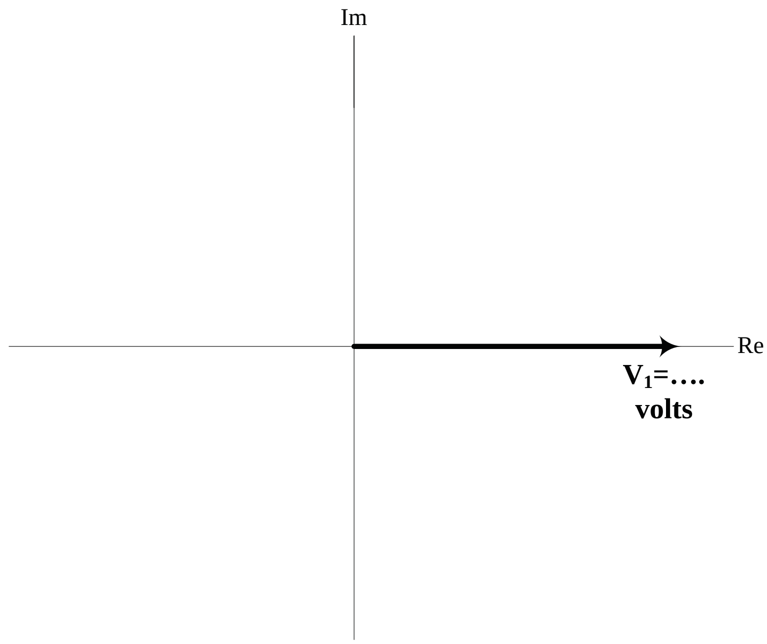
Time-shift between V_1 & V_2, Δt =……………μs

TA signature:…………………………….

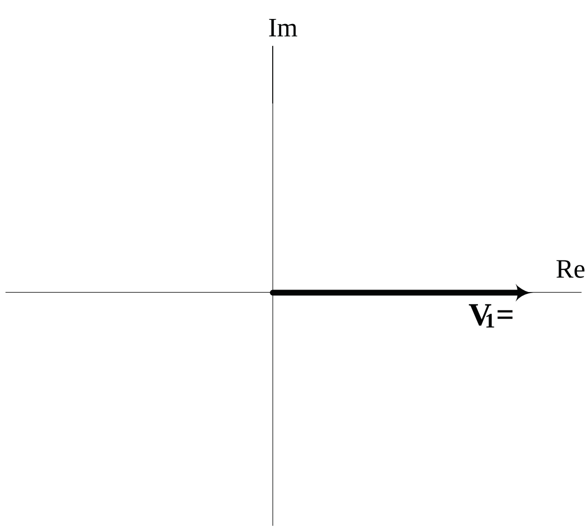
LAB REPORT (**Weight**: 60%)

Phasor relations :

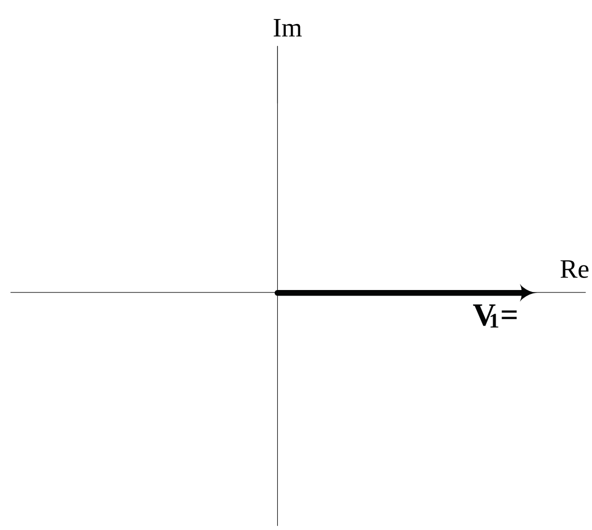
(a)From the printout data of Step 3 , draw the voltage phasors V_1, V_2 and the current phasor I on the complex co-ordinate plane below. Then draw the phasor $I_p=V_1/R_p$ .Graphically obtain V_c by using the KVL phasor relation $V_c = V_1-V_2$.[Either draw the diagram to 'scale' or use complex-number algebra* on the phasors you have drawn.[* show calculations by the side of the diagram]



(b)From the printout data of Step 6 , draw the phasors V_1 and I on the complex co-ordinate plane below for each of the two frequencies used.



f_1 =



f_2 =

Impedance determination: **ALL EXPERIMENTAL IMPEDANCE DETERMINATIONS SHOULD USE RMS VOLTAGE AND TIME-SHIFT (cursor0 DATA FROM THE PRINTOUTS**

(a) From the data of Step 3,
Determined value of Z_{RC} = ……… ∠ …………. Ω

Magnitude Error between determined and nominal values (referred to nominal)
= …………………………………… %

Angle Error between determined and nominal values (referred to nominal)

= …………………………………… %

Comments:

(b) (i) From the data of Step 6,
Sample frequency f_1 = ………………Hz

Determined value of $Z(\omega_1)$ = ……… ∠ …………. Ω

Magnitude Error between determined and nominal values (referred to nominal)

= …………………………………… %

Angle Error between determined and nominal values (referred to nominal)

= …………………………………… %

(ii) From the data of Step 6,
Sample frequency f_2 = ………………Hz

Determined value of $Z(\omega_2)$ = ……… ∠ …………. Ω

Magnitude Error between determined and nominal values (referred to nominal)
= …………………………………… %

Angle Error between determined and nominal values (referred to nominal)

= …………………………………… %

Comments:

(c) From the data of Step 7 :

Frequency f = …………

Determined value of $Z(\omega_2)$ = ……… ∠ …………. Ω

Magnitude Error between determined and nominal values (referred to nominal)

= …………………………………… %

Angle Error between determined and nominal values (referred to nominal)

= …………………………………… %

<u>Comments</u>:

DISCUSSION & CONCLUSION: [Discuss possible reasons for any differences observed between tthe experimental results and the 'theoretically' predicted ones. Express, in your own words, what you learned from this experiment.]