

The University of Jordan
School of Engineering
Electrical Engineering Department

EE 374
Electrical Engineering and Machines Lab

EXPERIMENT 4 REPORT

CAPACITIVE REACTANCE

Section #: _____

Group #: _____

Student Name

ID

1. _____

2. _____

3. _____

4. _____

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PROCEDURE A - AC-EXCITED SERIES RC CIRCUIT

Table 1

AC Source Frequency (Hz)	period T (ms)	V_C (V)	$\angle V_C$ with V_S (Lag = negative)	V_R (V)	$\angle V_R$ with V_S (Lead = positive)	I (mA)	$\angle I$ (degree)
50							
200							
700							
1000							

1. Can we just subtract the magnitudes of $|V_S| - |V_C|$ to obtain the magnitude $|V_R|$? Why?

2. What is the relationship between the periods T of the two signals V_S and V_R ?

3. Plot the following versus source frequency using the values in Table 1, 2 and 3:

- (1) X_C and $|Z|$ on the same plot.
- (2) $\angle Z$.
- (3) V_C and V_R on the same plot.
- (4) P and Q on the same plot.

Table 2

AC Source Frequency (Hz)	X_C (k Ω)	$ Z $ (k Ω)	$\angle Z$ (degrees)
50			
200			
700			
1000			

Table 3

AC Source Frequency (Hz)	$ S $ (mVA)	$\angle S$ (degrees)	P (mW)	Q (mVAR)	PF value	PF lead or lag
50						
200						
700						
1000						

4. From Table 3, at what frequency the real power P and the magnitude of the reactive power $|Q|$ is maximum?

PROCEDURE B - AC-EXCITED PARALLEL RC CIRCUIT

Table 4

AC Source Frequency (Hz)	$V_{R'}$ (mV)	$\angle V_{R'}$ with V_s (Lead = positive)	$V_R = V_C$ (V)	$\angle V_R$ with V_s (degrees)
800				
1100				
2200				
6500				

Table 5

AC Source Frequency (Hz)	I (mA)	$\angle I$ with V_s (Lead = positive)	I_R (mA)	$\angle I_R$ with V_s (degrees)	I_C (mA)	$\angle I_C$ with V_s (degrees)
800						
1100						
2200						
6500						

Table 6

AC Source Frequency (Hz)	B_C (mS)	$ Y $ (mS)	$\angle Y$ (degrees)
800			
1100			
2200			
6500			

1. Can we just subtract the magnitudes of $|I| - |I_R|$ to obtain the magnitude $|I_C|$? Why?

2. Plot the following figures versus source frequency using the values in Table 5 and 6:

- (1) B_C and $|Y|$ on the same plot.
- (2) $\angle Y$ versus source frequency.
- (3) I_C and I_R on the same plot.

**** End ****