

Electrical assignment 1

by Matt Haycock

FILE	23496_MATT_HAYCOCK_ELECTRICAL_ASSIGNMENT_1_305416_104421198 9.DOCX (426.2K)		
TIME SUBMITTED	08-JAN-2021 01:06PM (UTC+0000)	WORD COUNT	3049
SUBMISSION ID	141244224	CHARACTER COUNT	17568

Electrical Engineering

ACDA5001

Matt Haycock

2012802

***Assignment report – AC Response of an RLC
network***

Date 05 Jan. 2020

Abstract

This is a report on how an AC R-L-C circuit acts and responds to changes in its frequency. It also shows how the circuit behaves when the resonant frequency is achieved.

Graphs have been created to show how current, component voltages drops, active, reactive, apparent power and power factor behaves when plotted against frequency.

Phasor diagrams have also been created to show the component voltages 25Hz below, during and above resonance. This is to show the impedance at a moment in time and the angle of this impedance.

From this impedance, we can determine the real, apparent and reactive power that will give us our angle theta. From this we can determine the power factor, which is a measure of how productive the circuit is running. Optimum for this is usually around 1.

Due to a load of industrial strength being mainly inductive, a capacitor will be added to the circuit to balance the shift in phase between the current and the voltage.

This is known as the Power Factor Correction.

During the study, it has shown that when the circuit is at resonance, the current will drop to zero. It also shows that when the circuit is at resonant frequency the circuit is purely resistive. We can see this from the voltages across the resistor dropping and the impedance components voltage is increasing.

The report will also show that to obtain max power for an AC circuit, the impedance load will have to equal the impedance source.

Introduction

An RLC circuit comprises of three electrical components, a resistor (R), inductor (L), and a capacitor (C). These components can be connected in a circuit either in series or parallel. [1]

The sum of the voltage across the circuit is measured in a vector sum, rather than a sum of the voltage across the three components. The resistor will be in phase with the current. For the inductor, the voltage will lead the current by 90 degrees. For the capacitor, the voltage will lag behind the current by 90 degrees. [1]

So, due to the voltages in each component being out of phase with one another they cannot be calculated in an arithmetical way. [1]

Resistance, inductive and capacitive reactance is called the impedance, which is the hindrance of the flow of the current it is located in. [1]

With the circuit containing components that will store energy, the frequency can be adjusted so that maximum response in the circuit is achieved. This is called resonance. [2]

 3 This is the occurrence of the frequency that happens at the same time as the power that is being achieved. It can be referred to as a tuned circuit. A radio would be a good example of this action. [3]

Power factor is used in AC circuits and is used to measure the consumption of energy used from a small piece of equipment to a large energy station. It is the ratio of true power over apparent power. The reactive power is seen as useless. It is the true power that does all the work. [16]

A building that uses a lot of energy will be measured by its power factor. An energy company will charge the building if the power factor falls below a set limit, usually around 0.95.

In an inductive circuit, the current will be out of phase with the voltage. This means current will be lagging the voltage, and electricity will be wasted.

In a capacitive circuit, the current and voltage will also be out of phase with one another. But this time the current will be leading, again electricity used will be wasted to do the same job.

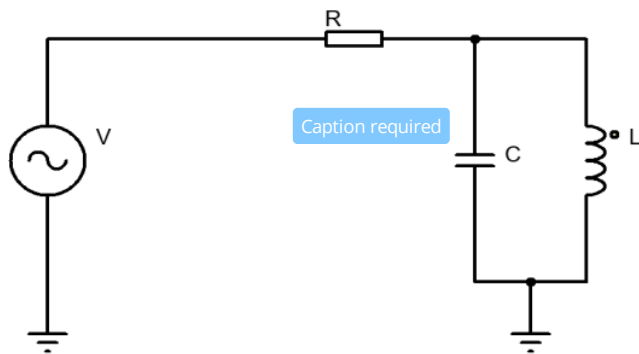
In order to improve the power factor of the circuit, we must introduce either a capacitor in the inductive circuit, or an inductor into the capacitive circuit. This will bring the circuit back into phase and make the circuit more efficient. [4]

Maximum power transfer happens when in an AC circuit that contains internal impedance is connected to a load. The maximum power will take place when impedance of the load source matches the conjugate of the impedance of the source. [5]

In an application, for example, a TV system, the strength at the receiving end of the antenna would be minimal. To increase the signal form, the antenna, the impedance of both the antenna and the receiver must be equal. [5]

In this assignment I will show how I created a model of the RLC circuit below. The component values have come from my student number 2012802.

The circuit is connected to a 10V sinusoidal source.



Inductor (L) = 201mH

Resistor (R) = 28Ω

Capacitor (C) = 205μF

Method

TASK1

The model created was to analyse and evaluate an AC electrical circuit. This was done by producing graphs for the following: -

- 1.Circuit current against frequency.
- 2.Component voltage drops against frequency.
- 3.Active, reactive and apparent power against frequency
- 4.Power factor against frequency

The graphs will be logarithmic. So, the frequencies will be spaced out to match this. They will range from 1 to 2 million in 20 steps.

1.Circuit current against frequency

A circuit at resonance must be found to ascertain the potential of the circuit, and to find its 'sweet spot'. Therefore, we must first find out the resonant frequency of the circuit.

- a. To find my resonant frequency, use the formula. [6]

$$f_{res} = \frac{1}{2\pi\sqrt{LC}}$$

Where L equals the inductor and C equals the capacitor value.

My resonant frequency calculates at 79, so I will add that in the range of frequencies.

Missing Units

We next need to find the total impedance of the parallel section of the circuit which contains the inductor and the capacitor.

b. Find the reactance of the inductor and the capacitor.

To find the inductive reactance X_L , use the formula. [7]

$$X_L = 2\pi fL$$

Where f equals the frequency and L equals the inductor

At resonance, $X_L = 99.7\Omega$

c. To find the capacitive reactance, use the formula. [8]

$$X_C = \frac{1}{2\pi fC}$$

Where C equals the capacitor

At resonance, $X_C = 100.7\Omega$

Now we have found the impedance components respectfully, we have found what the total impedance is in our circuit.

d. Calculate the Total reactance X_T , using the formula. [9]

$$X_T = X_L - X_C$$

When the circuit is at resonance, the circuit will be purely resistive. Therefore, we need to add the resistor in the next calculation. This will be to find the total impedance in the circuit. [10]

e. Calculate the Total Impedance $|Z|$, using the formula. [11]

$$|Z| = \sqrt{R^2 + (X_L - X_C)^2}$$

At resonance, $|Z| = 10465.7$

We now have the total impedance in the circuit. We can now find out the current in the circuit.

f. Calculate current $|I|$, using the formula. [12]

$$|I| = \frac{V}{Z_t}$$

Where V equals the voltage. And Z_t equals the impedance total, which includes the resistor.

This is the same method we would use ohms' law and its triangle to find our values.

At resonance, $|I| = 95mA$

2. Component voltage drops against frequency.

Now we have the current across the circuit, we can now work out the voltage drops across the respective components.

a. Calculate voltage across the resistor, using the formula. [13]

$$V_r = IR$$

At resonance, $V_r = 0.026V$

b. Calculate voltage across the impedance, using the formula. [14]

$$V_{lc} = IZ_t$$

At resonance, $V_{lc} = 9.99V$

3. Active, reactive and apparent power against frequency

Due to the fact that our impedance components actually lose nothing in the way of power, the voltage will drop when active so will take current in the circuit. This is called reactive power. We can now see how much of this power is being taken out of our circuit. We can do this by calculating the active, reactive and apparent power. [15]

We can first find out how much of the real or active power is being used in the circuit.

a. Calculate Real Power P , using the formula. [16]

$$P = |I|^2 R$$

At resonance, $P = 3.56W$

Then we can find out how much of the wasted power (reactive), is being used.

b. Calculate Reactive Power Q , using the formula. [16]

$$Q = |I|^2 X$$

At resonance, $Q = -0.0095VAR$

Where X equals the total impedance of the circuit, which includes the resistor.

We can now calculate the apparent power of the circuit. This is the combination of the current and voltage in the circuit and does not refer to the angle of it phase. [17]

c. Calculate Apparent Power, using the formula. [16]

$$|S| = \sqrt{P^2 + Q^2}$$

At resonance, $|S| = -0.0095VA$

4. Power factor against frequency

Now we have the three calculations to make up our "power triangle". Apparent power for our hypotenuse, and reactive and true power for our opposite and adjacent sides, we can now work out our power factor, which is the difference between our apparent and true power. It is the angle that separates the power that is dissipated to that which is taken back. [18]

We can first work out the angle of the power triangle.

a. Calculate the angle ϕ , using the formula. [19]

$$\phi = \cos^{-1} \frac{P}{S}$$

At resonance, $\phi = 89.78$

b. Calculate the Power Factor, using the formula. [18]

$$pf = \cos \phi$$

At resonance, $pf = 0.0037$

TASK 3

$$X_L = 2\pi fL$$

Assuming $f = 50\text{Hz}$ [18]

$$X_L = 2 \times \pi \times 50 \times 150 \times 10^{-6}$$

$$X_L = 0.04712 \text{ H}$$

$$X_L = X_C$$

$$\text{Capacitor value} = \frac{1}{2\pi f X_L}$$

$$\text{Capacitor value} = 1 / 2 \times \pi \times 50 \times 0.04712$$

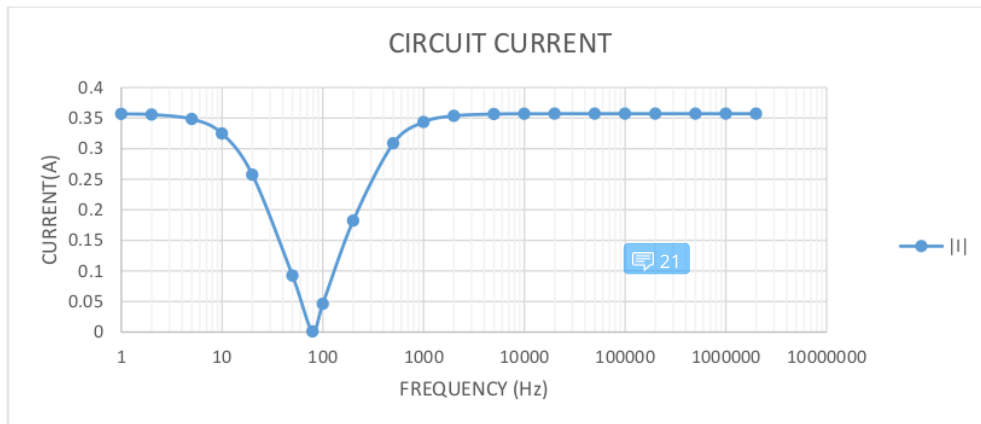
$$= 0.0675 \text{ F} \quad [19]$$

Results

Task 1

1. Circuit current against frequency

As you can see from the graph when the frequency is at resonance (79Hz), the current is at its lowest. This is due to the capacitor and inductor being parallel and are both sharing the energy being created. This will contribute to no current being drawn from the supply. [20]

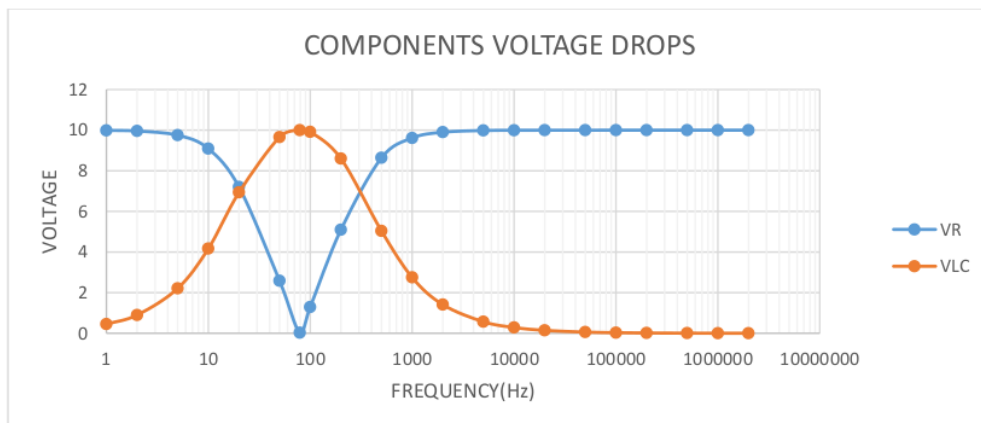


Graph showing current against frequency, resonance at 79Hz shows drop in current

2. Component Voltage drops against frequency.

In this graph we can see that when the frequency is at resonance the voltage is at its lowest. This is due to the impedance at resonance to be of resistance alone. The current and voltage will be in phase. [21]

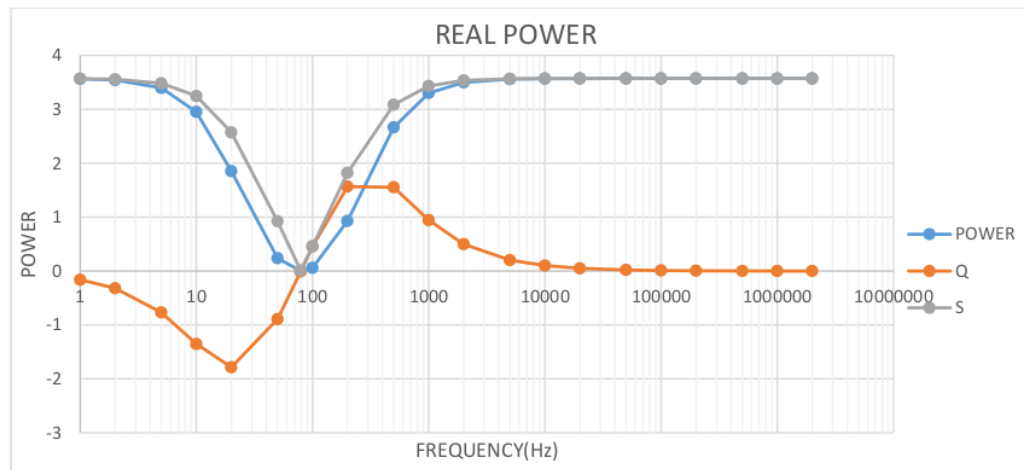
The graph also shows that at resonance, when the voltage across the resistor is at its lowest, the voltage across the inductor and capacitor is at its highest.



Voltage across resistor drops at resonance, voltage across inductor and capacitor peaks

3. Active, reactive and apparent power against frequency

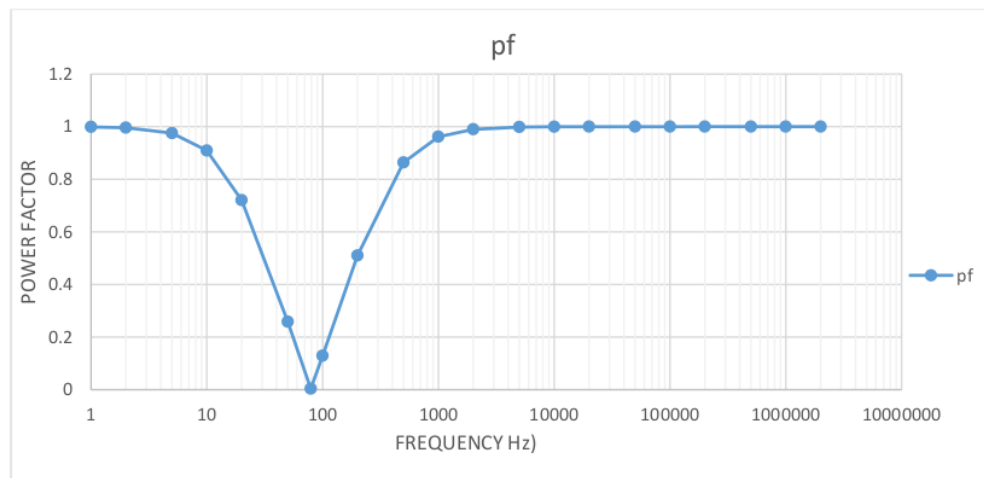
From this graph, we can see that at resonance frequency, real and apparent follow the same path, and is at its minimum. On the other hand, we can see that reactive power lowers into minus numbers, before rising through resonance.



At resonance, real and apparent power both drop, reactive rises through resonance

4. Power Factor against frequency

From this graph, we can see that during resonance, the power factor drops to its minimum. This is due to the frequency being proportional to the inductive load. It also shows that the voltage and current are out of phase by 90 degrees.

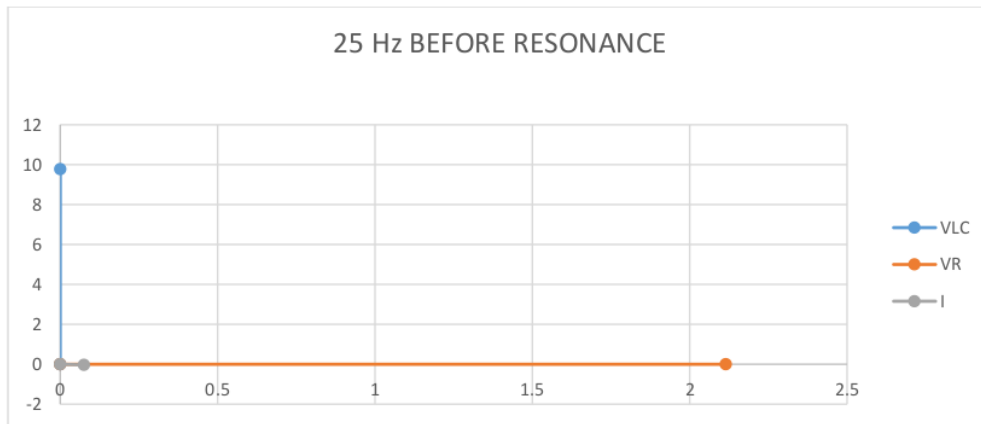


Graph showing power factor against frequency. Power factor drops to zero at resonance

Task 2

25Hz Before resonance

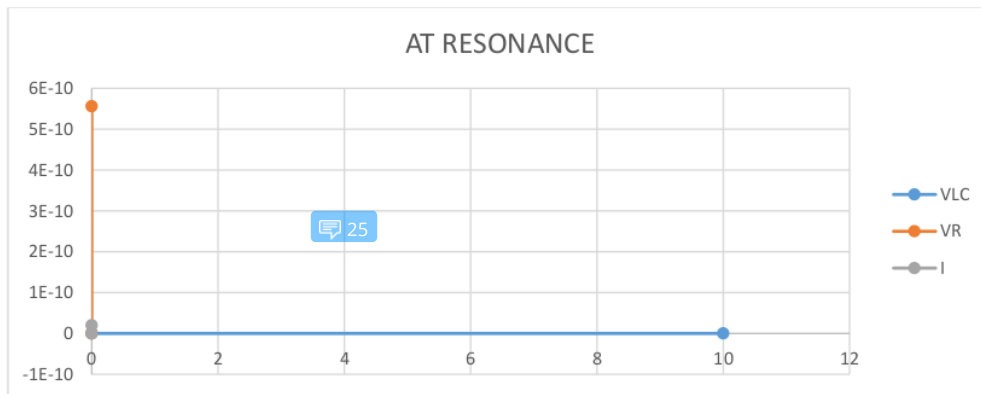
From the graph below, we can see that the voltage across the resistor is in phase with the current of the circuit. While the voltage across the capacitor and inductor are out of phase and is leading by 90 degrees.



Phasor diagram 25Hz before resonance, showing current lagging inductor and capacitor voltage

At Resonance

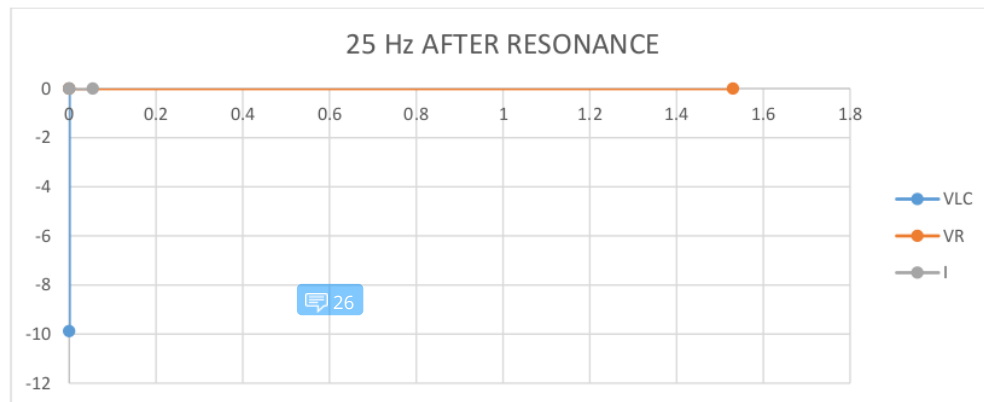
In this graph, we can see that at resonance the voltage across the resistor and current are in phase with one another. But is leading the voltage across the inductor and capacitor and is out of phase by 90 degrees.



Phasor diagram at resonance, showing current and resistor voltage in phase, inductor and capacitor voltage lagging

25Hz After resonance

In this graph, we can see that the current and the voltage across the resistor are in phase with one another. And the voltage across the inductor and capacitor is out of phase and lagging by 90 degrees.



Phasor diagram 25 Hz after resonance, showing current and resistor voltage in phase, inductor and capacitor voltage lagging

Discussion

From the model built, and the resultant graphs created from it, we can see that when the circuit is at resonance the current will drop to zero. This is due to the capacitor and inductor working like an independent circuit sharing the energy created. No voltage will be given, so no current will flow when this happens.[22]

With the circuit current and voltage in phase with one another, when the capacitor and inductor “share” their own energy, no voltage will be drawn across it. The circuit will be purely resistive. So the voltage will only be drawn across the resistor.

27A 180° shift in phase will take place due to the two components being opposite. This will cause them to cancel themselves out.

With regards to the Power Factor and the Power Triangle, we know that real power is the impedance multiplied by current. So, when the current drops at resonance, the real power will drop with it.[23]

When the circuit is at resonance the voltage across the impedance is at its maximum and the voltage across the resistor is at its minimum. This is due to the capacitor discharging and building the inductor's magnetic field by the current. [24]

The capacitor will be charged by the inductors magnetic space diminishing. The resonance will take place when these two impedances equal out. It creates a steady oscillation in the circuit. This will cause the impedance in the circuit to reach its maximum. [25]

Maximum power transfer takes place in an AC circuit when the load of the impedance matches the impedance of the source.[26]

A power factor correction will occur to decrease the input current and apparent power. This will increase the power factor. In order to get the most out of the real power in an AC supply, the input current is governed by the power factor correction. [27]

In an ideal scenario, an electrical circuit with impedances should be purely resistive. This would show that the reactive power is showing as zero.



Conclusions

From carrying out this report, the below conclusions can be made:

- Maximum power transfer occurs when the impedance from the source is equal to the impedance of the load.
- Resonance occurs when the frequency is adjusted to allow maximum performance in the capacitor and inductor.
- In a phase diagram at resonance, the voltage across the resistor will be in phase with the current. The voltage across the inductor and capacitor will be lagging 90 degrees.
- Capacitor stores the voltage as an electric charge. Resistance will be added when this happens. It impedes the flow of current.
- Inductor will store the electrical energy as a field of magnetism around a coil. This will induce a voltage which is in opposition to the main voltage.
- The higher the frequency, the greater the opposition to the flow of current will occur. This opposition will account for the voltage drop across the inductors.
- Inductance is in relationship with frequency. When inductance is at zero, frequency is at zero.
- In the power triangle, the real, reactive and apparent power are all related to one another via trigonometry. The phase angle of the impedance of the circuit will equal the angle that is opposite.

References

1. Electrical 4 U, "What is RLC Circuit Analysis?", *Electrical 4 U*, Oct. 26, 2020 [Online]
Available: <https://www.electrical4u.com/rlc-circuit/>
[Accessed Nov. 1, 2020]
2. C Vivek, "Resonance in R-L-C Series Circuits (With Diagram) Electrical Engineering", *Engineering Notes*, Oct. 26, 2020 [Online]
Available: <https://www.engineeringenotes.com/electrical-engineering/circuits/resonance-in-r-l-c-series-circuits-with-diagram-electrical-engineering/27713>
[Accessed Nov. 1, 2020]
3. Toppr, "What is Resonant Frequency and How to Calculate it?", *Toppr*, Published date unknown [Online]
Available: <https://www.toppr.com/guides/physics/waves/what-is-resonant-frequency-and-how-to-calculate-it/>
[Accessed Nov. 4, 2020]
4. P Evans, "Power Factor Explained", *The Engineering Mindset.com*, Nov. 12, 2018 [Online]
Available: <https://theengineeringmindset.com/power-factor-explained/>
[Accessed Nov. 2, 2020]
5. Electrical Technology, "Maximum Power Transfer Theorem for AC & DC Circuits", *Electrical Technology*, Published date unknown [Online]
Available: <https://www.electricaltechnology.org/2015/08/maximum-power-transfer-theorem-for-ac-dc-circuits.html>
[Accessed Nov. 1, 2020]
6. Electrical Concepts, "Resonant Frequency Formula and Derivation", *Electrical Concepts*, Apr. 24, 2019 [Online]
Available: <https://electricalbaba.com/resonant-frequency-formula/#:~:text=Resonant%20Frequency%20Formula%20%E2%80%93%20Series%20Resonance%20Circuit.%20The,series%20connection%20is%20excited%20by%20an%20AC%20source.>
[Accessed Nov. 1, 2020]
7. Electronics Notes, "Inductive Reactance Formula & Calculations", *Electronics Notes*, Published date unknown [Online]

Available: https://www.electronics-notes.com/articles/basic_concepts/inductance/inductive-reactance-formula-calculations.php
[Accessed Nov. 12, 2020]

8. Electronics Notes, "Capacitive reactance", *Electronics Notes*, Published date unknown [Online]

Available: https://www.electronics-notes.com/articles/basic_concepts/capacitance/capacitive-reactance.php
[Accessed Nov. 12, 2020]

9. ElecCircuit, "Basic of Impedance and Reactance in Definition, Formula", *ElecCircuit*, Oct. 12, 2020 [Online]

Available: <https://www.eleccircuit.com/impedance-and-reactance/>
[Accessed Nov. 12, 2020]

10. Electronics Tutorials, "Parallel Resonance Circuit", *Electronics Tutorials*, Published date unknown [Online]

Available: <https://www.electronics-tutorials.ws/accircuits/parallel-resonance.html>
[Accessed Nov. 4, 2020]

11. ElecCircuit, "Basic of Impedance and Reactance in Definition, Formula", *ElecCircuit*, Oct. 12, 2020 [Online]

Available: <https://www.eleccircuit.com/impedance-and-reactance/>
[Accessed Nov. 12, 2020]

12. Electronics Area, "Impedance of Inductor", *Electronics Area*, Published date unknown [Online]

Available: <https://electronicsarea.com/what-is-the-impedance-of-an-inductor/#:~:text=The%20impedance%20has%20a%20general%20formula%3A%20Z%20%3D,this%20case%20it%20is%20used%20for%20AC%20signals.>
[Accessed Nov. 12, 2020]

13. K Beck, "How to Calculate a Voltage Drop Across Resistors", *Sciencing*, Feb. 10, 2020 [Online]

Available: <https://sciencing.com/calculate-voltage-drop-across-resistors-6128036.html>
[Accessed Nov. 12, 2020]

14. Electrical Academia, "Series RLC Circuit", *Electrical Academia*, Published date unknown [Online]

Available: <https://electricalacademia.com/basic-electrical/series-rlc-circuit/>
[Accessed Nov. 12, 2020]

15. All About Circuits, " True, Reactive, and Apparent Power", *All About Circuits*,
Published date unknown [Online]
Available: <https://www.allaboutcircuits.com/textbook/alternating-current/chpt-11/true-reactive-and-apparent-power/>
[Accessed Nov. 4, 2020]
16. Electrical Academia, " Power Triangle and Power Factor in AC Circuits", Published
date unknown [Online]
Available: <https://electricalacademia.com/electric-power/power-triangle-power-factor-ac-circuits/>
[Accessed Nov. 12, 2020]
17. All About Circuits, " True, Reactive, and Apparent Power", *All About Circuits*,
Published date unknown [Online]
Available: <https://www.allaboutcircuits.com/textbook/alternating-current/chpt-11/true-reactive-and-apparent-power/>
[Accessed Nov. 4, 2020]
18. All About Circuits, " Calculating Power Factor", *All About Circuits*, Published date
unknown [Online]
Available: <https://www.allaboutcircuits.com/textbook/alternating-current/chpt-11/calculating-power-factor/>
[Accessed Nov. 4, 2020]
19. G Pritam, " Trigonometry Formulas & Identities: Complete List of Trigonometric
Formulas (Class 10 To 12)", *Embibe*, Jul.20, 2020 [Online]
Available: <https://www.embibe.com/exams/trigonometry-formulas/>
[Accessed Nov. 4, 2020]
- 20, 21,22. Electronics Tutorials, " Parallel Resonance Circuit", *Electronics Tutorials*,
Published date unknown [Online]
Available: <https://www.electronics-tutorials.ws/accircuits/parallel-resonance.html>
[Accessed Nov. 4, 2020]
23. All About Circuits, " True, Reactive, and Apparent Power", *All About Circuits*, Published
date unknown [Online]
Available: <https://www.allaboutcircuits.com/textbook/alternating-current/chpt-11/true-reactive-and-apparent-power/>
[Accessed Nov. 4, 2020]

24. Learning Electronics, " Inductors", *Learning Electronics*, Published date unknown [Online]

Available: http://www.learningelectronics.net/vol_1/chpt_15/1.html

[Accessed Nov. 4, 2020]

25. All About Circuits, " Magnetic Fields and Inductance", *All About Circuits*, Published date unknown [Online]

Available: <https://www.allaboutcircuits.com/textbook/direct-current/chpt-15/magnetic-fields-and-inductance/te.com>

[Accessed Nov. 12, 2020]

26. Electrical Technology, " Maximum Power Transfer Theorem for AC & DC Circuits", *Electrical Technology*, Published date unknown [Online]

Available: <https://www.electricaltechnology.org/2015/08/maximum-power-transfer-theorem-for-ac-dc-circuits.html>

[Accessed Nov. 12, 2020]

27. Electrical Technology, " Power Factor Correction", *Electrical Technology*, May 17, 2019 [Online]

Available: <https://www.electrical-technology.com/2019/05/power-factor-correction.html>

[Accessed Nov. 12, 2020]

Electrical assignment 1

GRADEMARK REPORT

FINAL GRADE

GENERAL COMMENTS

Instructor

65/100

PAGE 1

PAGE 2



Comment 1

This paragraph should have been part of the previous paragraph as it is still talking about the same thing.



Comment 2

Nice abstract but could have been a bit briefer.

PAGE 3



Comment 3

What are you trying to say?



Comment 4

Although all the facts you have stated are correct, this is very difficult to read and feels somewhat clunky.

PAGE 4



Comment 5

from not form.

You should proofread your work and correct any typos found.



Comment 6

Use of first person voice.

You should not use the first person voice in technical reports. instead you should use the third person passive voice.

e.g. " This report discusses the construction and simulation of an RLC circuit, as shown in Figure 1."



Comment 7

You should caption your figures so that you can instruct your reader to look at the intended figure.

e.g. "... RLC circuit, as shown in Figure 1."



Caption required

You should always include a caption on figures, equations and tables to allow you to refer to them in your text.

e.g. An illustration of this can be seen in figure 2. The relationship of the variables is shown in equation 2. Table 1 shows the results of the first experiment where the control variable, temperature in degrees celsius is shown in the first column....



Comment 8

Does the "this" refer to the creation of the model, or to the analysis of it? I reads as though it should be referring to the creation but it actually refers to the analysis,



Comment 9

Units?

1 Hz to 2 MHz



Comment 10

You were resonating?



Caption required

You should always include a caption on figures, equations and tables to allow you to refer to them in your text.

e.g. An illustration of this can be seen in figure 2. The relationship of the variables is shown in equation 2. Table 1 shows the results of the first experiment where the control variable, temperature in degrees celsius is shown in the first column....



Missing Units

What units is this in?

You should always include the units for all quantities you describe in your text. Some quantities have more than one unit. Frequency, for example, can be measured in Hertz (Hz) or radians per sec (rad/s).

Make it clear for your reader and remove any ambiguity.



Caption required

You should always include a caption on figures, equations and tables to allow you to refer to them in your text.

e.g. An illustration of this can be seen in figure 2. The relationship of the variables is shown in equation 2. Table 1 shows the results of the first experiment where the control variable, temperature in degrees celsius is shown in the first column....



Comment 11

Incorrect units.

XL, inductive reactance is measured in Ohms, not Henrys.



Caption required

You should always include a caption on figures, equations and tables to allow you to refer to them in your text.

e.g. An illustration of this can be seen in figure 2. The relationship of the variables is shown in equation 2. Table 1 shows the results of the first experiment where the control variable, temperature in degrees celsius is shown in the first column....



Comment 12

Wrong units.

XC, capacitive reactance is measured in Ohms not Farads.



Comment 13

Should be using third person passive voice. Avoid I, We, You etc..



Caption required

You should always include a caption on figures, equations and tables to allow you to refer to them in your text.

e.g. An illustration of this can be seen in figure 2. The relationship of the variables is shown in equation 2. Table 1 shows the results of the first experiment where the control variable, temperature in degrees celsius is shown in the first column....

QM

Caption required

You should always include a caption on figures, equations and tables to allow you to refer to them in your text.

e.g. An illustration of this can be seen in figure 2. The relationship of the variables is shown in equation 2. Table 1 shows the results of the first experiment where the control variable, temperature in degrees celsius is shown in the first column....

QM

Missing Units

What units is this in?

You should always include the units for all quantities you describe in your text. Some quantities have more than one unit. Frequency, for example, can be measured in Hertz (Hz) or radians per sec (rad/s).

Make it clear for your reader and remove any ambiguity.

QM

Caption required

You should always include a caption on figures, equations and tables to allow you to refer to them in your text.

e.g. An illustration of this can be seen in figure 2. The relationship of the variables is shown in equation 2. Table 1 shows the results of the first experiment where the control variable, temperature in degrees celsius is shown in the first column....

QM

Caption required

You should always include a caption on figures, equations and tables to allow you to refer to them in your text.

e.g. An illustration of this can be seen in figure 2. The relationship of the variables is shown in equation 2. Table 1 shows the results of the first experiment where the control variable, temperature in degrees celsius is shown in the first column....

QM

Caption required

You should always include a caption on figures, equations and tables to allow you to refer to them in your text.

e.g. An illustration of this can be seen in figure 2. The relationship of the variables is shown in equation 2. Table 1 shows the results of the first experiment where the control variable, temperature in degrees celsius is shown in the first column....



Comment 14

impedance includes resistance. I think you mean "reactive components"



Caption required

You should always include a caption on figures, equations and tables to allow you to refer to them in your text.

e.g. An illustration of this can be seen in figure 2. The relationship of the variables is shown in equation 2. Table 1 shows the results of the first experiment where the control variable, temperature in degrees celsius is shown in the first column....



Caption required

You should always include a caption on figures, equations and tables to allow you to refer to them in your text.

e.g. An illustration of this can be seen in figure 2. The relationship of the variables is shown in equation 2. Table 1 shows the results of the first experiment where the control variable, temperature in degrees celsius is shown in the first column....



Comment 15

The units should be VAR, not VAR.

Also, how do you get negative power?

Surely this should be stated without the minus sign and stated as either capacitive or inductive?



Comment 16

Use of first person voice.

"The apparent power of the circuit can now be calculated."



Caption required

You should always include a caption on figures, equations and tables to allow you to refer to them in your text.

e.g. An illustration of this can be seen in figure 2. The relationship of the variables is shown in equation 2. Table 1 shows the results of the first experiment where the control variable, temperature in degrees celsius is shown in the first column....



Comment 17

Use of first person voice,

Use third person passive voice.

Caption required

You should always include a caption on figures, equations and tables to allow you to refer to them in your text.

e.g. An illustration of this can be seen in figure 2. The relationship of the variables is shown in equation 2. Table 1 shows the results of the first experiment where the control variable, temperature in degrees celsius is shown in the first column....



Comment 18

Good



Comment 19

Good

PAGE 9



Comment 20

You should caption your figures so you can refer to them properly, by number, in your text.
e.g. "As shown in figure 5."



Comment 21

Nice graph. clean, clear.

Good



Comment 22

Caption number needed.

Figure 3 Graph showing.....



Comment 23

number the captions.

PAGE 10



Comment 24

resonant frequency

PAGE 11



Comment 25

I'm not sure what is going on in this image. The current is in phase with the voltage across the resistor, but why is the current phasor pointing upwards?

PAGE 12



Comment 26

Good. After resonance, circuit is mainly inductive and hence the voltage across the reactive elements will be lagging the circuit current and the voltage across the resistor.



Comment 27

degrees symbol wrong.

PAGE 13



Comment 28

Good discussion, all valid points.

PAGE 14



Ref Qual

You should try to use more high quality reference sources, such as textbooks from reputable academic publishers and articles from peer reviewed journals.

PAGE 15

PAGE 16

PAGE 17

GRADING FORM: SMU GENERIC_SMOSEY

MATT HAYCOCK

65

ENGAGEMENT WITH LITERATURE

including reading, referencing, academic conventions and academic honesty



Inclusion of a wide range of research-informed literature, including sources retrieved independently. Selection of relevant and credible sources. Very good use of referencing conventions, consistently applied.

6.8

KNOWLEDGE & UNDERSTANDING

Knowledge of the basic underlying concepts and principles of a subject.



Knowledge is extensive. Exhibits understanding of the breadth and depth of established views.

18.3

COGNITIVE & INTELLECTUAL

Evaluate underlying concepts and principles of a subject and interpret qualitative and quantitative data in order to develop lines of argument and make sound judgements.



Thoroughly logical work, supported by evaluated evidence. High quality analysis, developed independently. Strong, persuasive, conclusions.

21.6

PRACTICAL APPLICATION SKILLS

Different approaches to solving problems in particular contexts.



A very good application of a range of methods, materials, tools and techniques. Very good consideration of the context of the application,

12.4

with perceptive use of examples, where relevant.
Evidence of some innovation and creativity.

TRANSFERABLE SKILLS

Communicate the results of their study/work accurately and reliably, and with structured and coherent arguments; the qualities needed for employment requiring the exercise of some personal responsibility within a structured and managed environment.



Can communicate effectively in a suitable format, but may have minor errors. You need to be more concise in your writing. Use captions for figures, equations and tables to allow you to refer to them in your text. Mostly coherent work and is in a suitable structure.

5.9