

# Program\_03\_1

## Requirements

Create a Matlab program to compute the magnitude and phase angle of the impedance (Z) of an RLC series circuit.

Given the following values:

- $R = 2$  (resistance in ohms)
- $L = 4 \times 10^{-3}$  (inductance in henries)
- $C = 10 \times 10^{-6}$  (capacitance in farads)
- $Z = R + ((w \cdot L) - (1/(w \cdot C))) \cdot i$  Impedance in V/A

Satisfy the following requirements

- Create a vector of angular frequencies from 1,000Hz to 10,000Hz in steps of 250Hz.
- Create a Z vector for each frequency (using the expression shown above)
- Create a vector containing the magnitude of Z for each frequency using the `abs()` function on Z
- Create a vector containing the phase angle of Z for each frequency using the `angle()` function on Z
- Compute the resonant frequency  $w_0 = 1/\sqrt{L \cdot C}$
- Compute the magnitude and phase angle of Z at the resonant frequency
- Use `short e` format for your output

## Program

In the code block below, create your program, editing the existing text as necessary.

**Note:** If you are using Octave then you will need to create a separate script file, save that separate file as the name **Program\_03\_01**. It will not conflict with this file of the same name since the extension will be different.

```
% Filename:
% Author:
% Assisted by:

% Program Description:

% Clear the command window and all variables

% Output of the title and author to the command window.
```

## Output

Output for Program\_03\_1 written by Geoff Berl.

w(1/s)	Zmag(A)	Angle(rad)
1.0000e+03	9.6021e+01	-1.5500e+00
1.2500e+03	7.5027e+01	-1.5441e+00
1.5000e+03	6.0700e+01	-1.5378e+00
1.7500e+03	5.0183e+01	-1.5309e+00
2.0000e+03	4.2048e+01	-1.5232e+00
2.2500e+03	3.5501e+01	-1.5144e+00
2.5000e+03	3.0067e+01	-1.5042e+00
2.7500e+03	2.5442e+01	-1.4921e+00
3.0000e+03	2.1427e+01	-1.4773e+00
3.2500e+03	1.7881e+01	-1.4587e+00
3.5000e+03	1.4708e+01	-1.4344e+00
3.7500e+03	1.1837e+01	-1.4010e+00
4.0000e+03	9.2195e+00	-1.3521e+00
4.2500e+03	6.8289e+00	-1.2736e+00
4.5000e+03	4.6720e+00	-1.1284e+00
4.7500e+03	2.8659e+00	-7.9838e-01
5.0000e+03	2.0000e+00	0
5.2500e+03	2.7950e+00	7.7335e-01
5.5000e+03	4.3103e+00	1.0883e+00
5.7500e+03	5.9546e+00	1.2283e+00
6.0000e+03	7.6012e+00	1.3045e+00
6.2500e+03	9.2195e+00	1.3521e+00
6.5000e+03	1.0802e+01	1.3846e+00
6.7500e+03	1.2348e+01	1.4081e+00
7.0000e+03	1.3859e+01	1.4260e+00
7.2500e+03	1.5338e+01	1.4400e+00
7.5000e+03	1.6786e+01	1.4514e+00
7.7500e+03	1.8207e+01	1.4607e+00
8.0000e+03	1.9602e+01	1.4686e+00
8.2500e+03	2.0974e+01	1.4753e+00
8.5000e+03	2.2325e+01	1.4811e+00
8.7500e+03	2.3656e+01	1.4862e+00
9.0000e+03	2.4969e+01	1.4906e+00
9.2500e+03	2.6265e+01	1.4946e+00
9.5000e+03	2.7546e+01	1.4981e+00
9.7500e+03	2.8813e+01	1.5013e+00
1.0000e+04	3.0067e+01	1.5042e+00

The resonant frequency = 5000(1/s)