# BIRZEIT UNIVERSITY

Faculty of Engineering and Technology
Department of Electrical and Computer Engineering

ENEE 2103

CIRCUITS AND ELECTRONICS LABORATORY

Experiment #4, Pre-Lab #8

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Section: 1

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Teaching assistant:

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Date: 29/11/2021

# 1. Part A (Impedance)

## 1.1 Resistive circuit

➔ Circuit using PSpice:
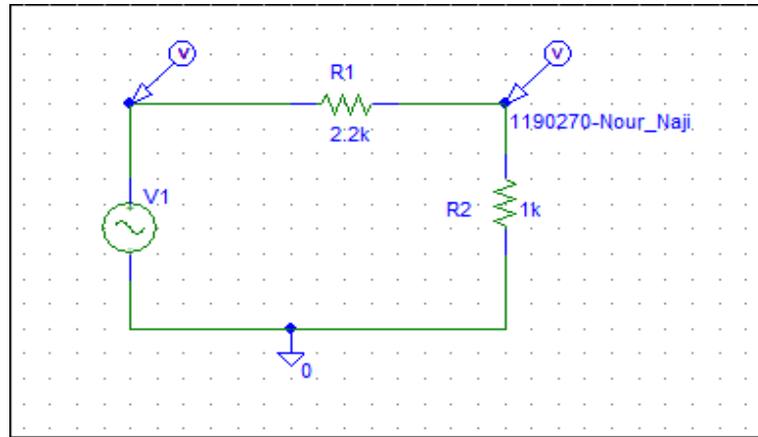


*Figure 1. 1*

### 1.1.1  Frequency = 1 kHz
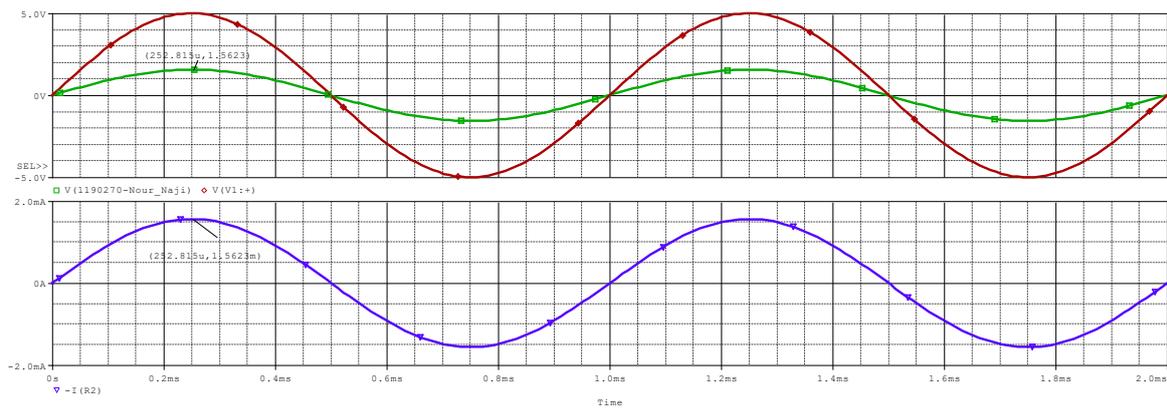


*Figure 1. 1.1.1*

### 1.1.2  Frequency = 500 Hz
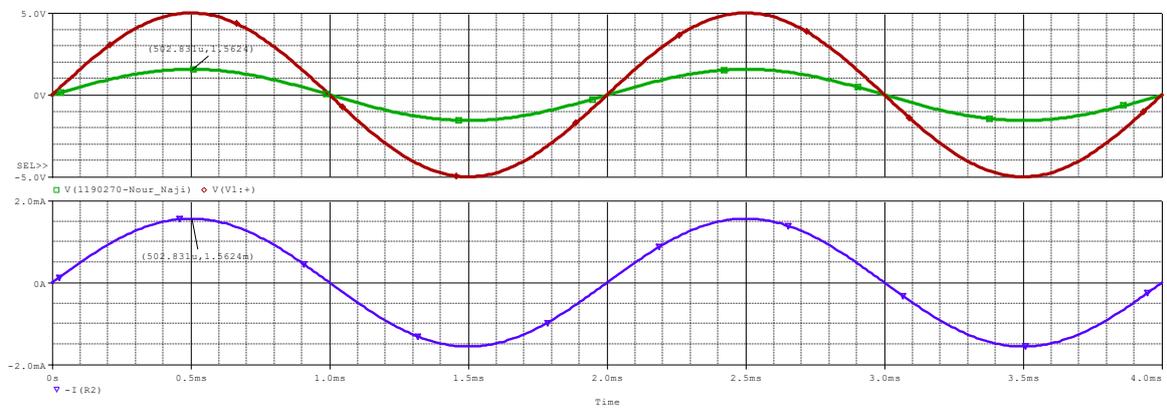


*Figure 1. 1.2.1*

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## 1.1.3  Frequency = 1500 Hz
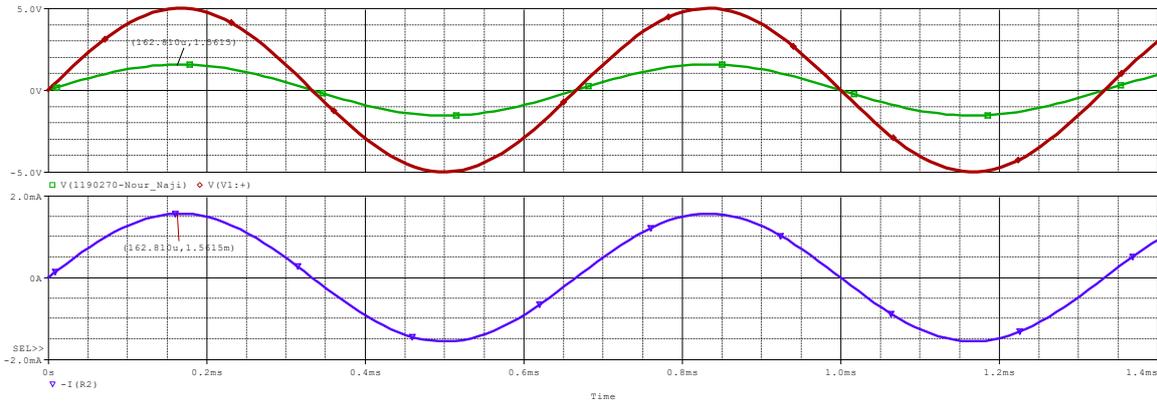


*Figure 1. 1.3.1*

## 1.1.4  All Frequencies
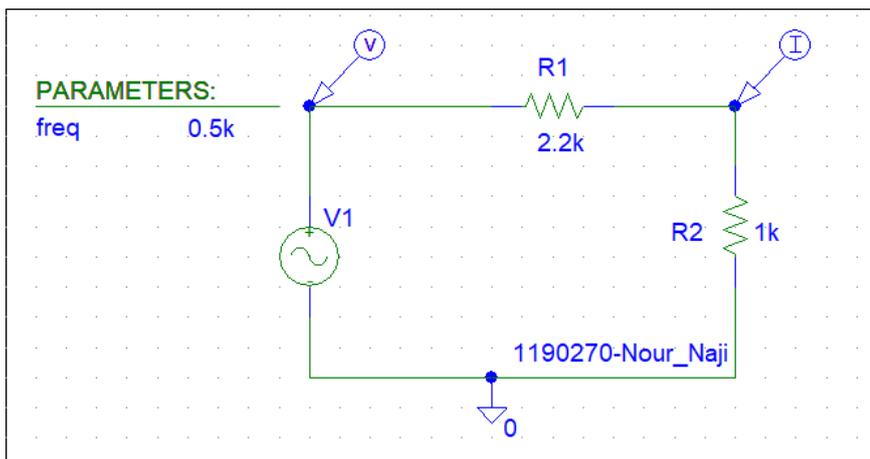


*Figure 1. 1.4.1*
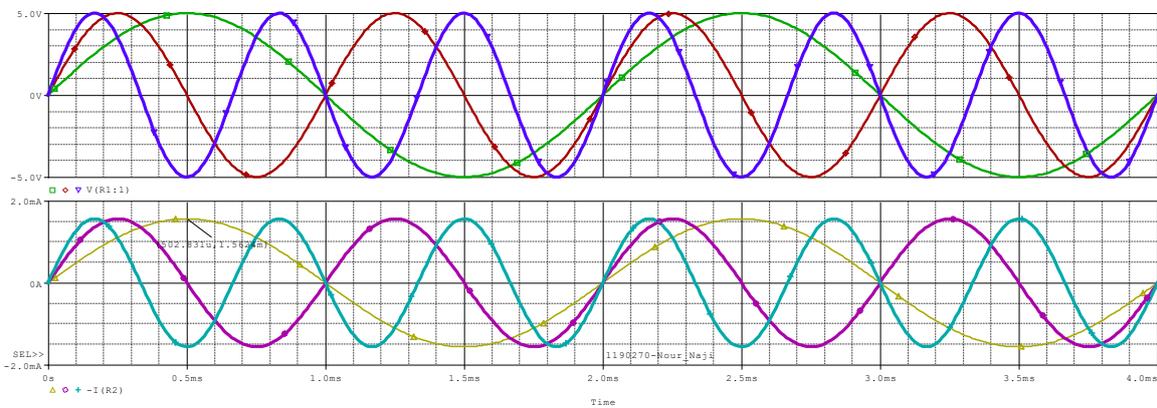


*Figure 1. 1.4.2*

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## 1.2  RC circuit

➔ Circuit using PSpice:
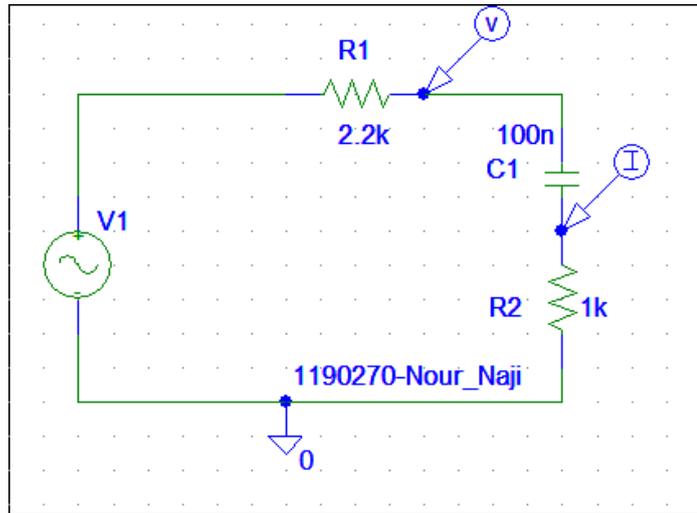


*Figure 1. 2.1*

### 1.2.1 Frequency = 1000 Hz
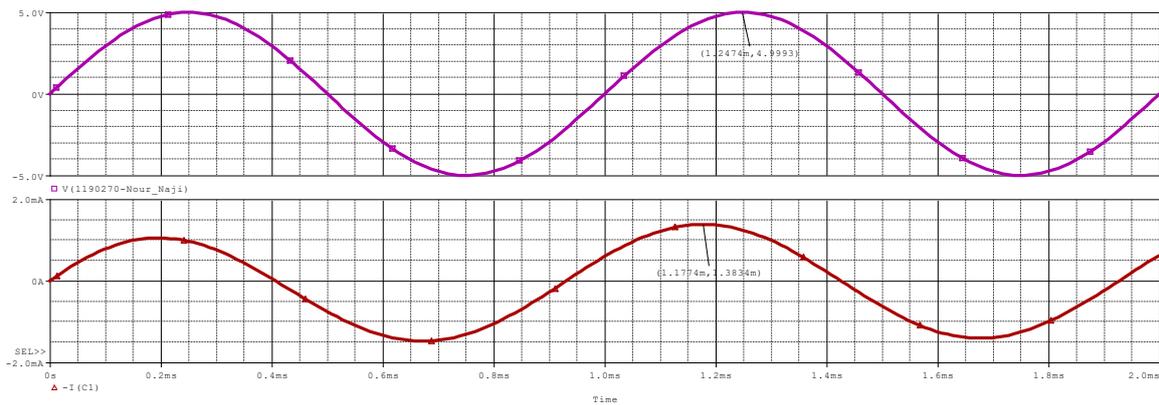


*Figure 1. 2.1.1*

### 1.2.2 Frequency = 500 Hz



*Figure 1. 2.2.1*

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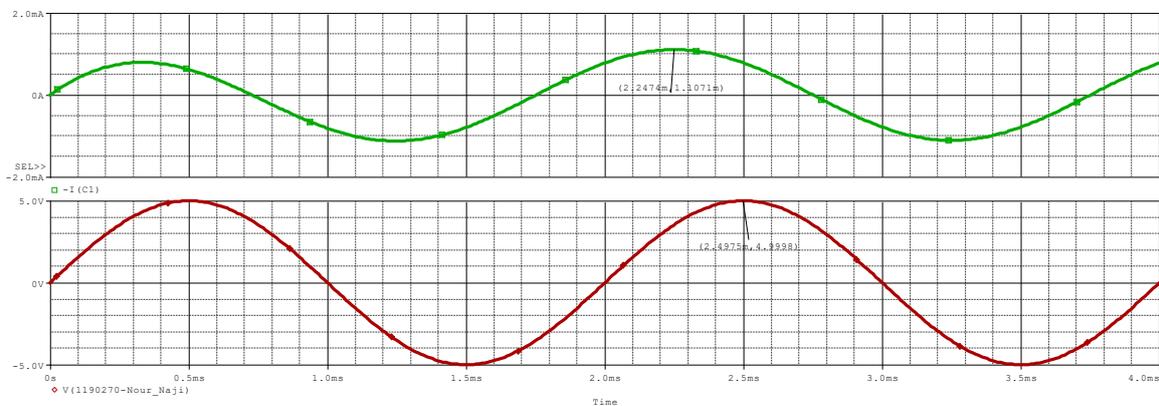
### 1.2.3 Frequency = 1500 Hz
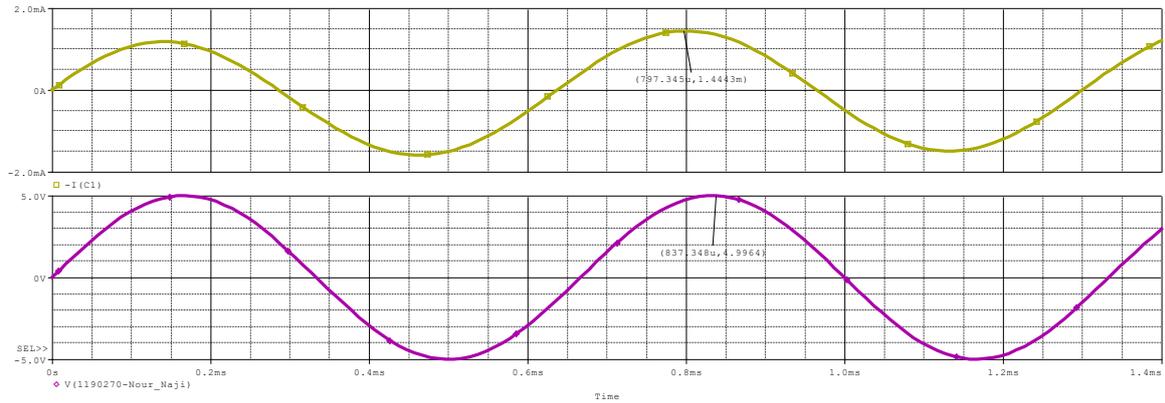


*Figure 1. 2.3.1*

### 1.2.4 All Frequencies
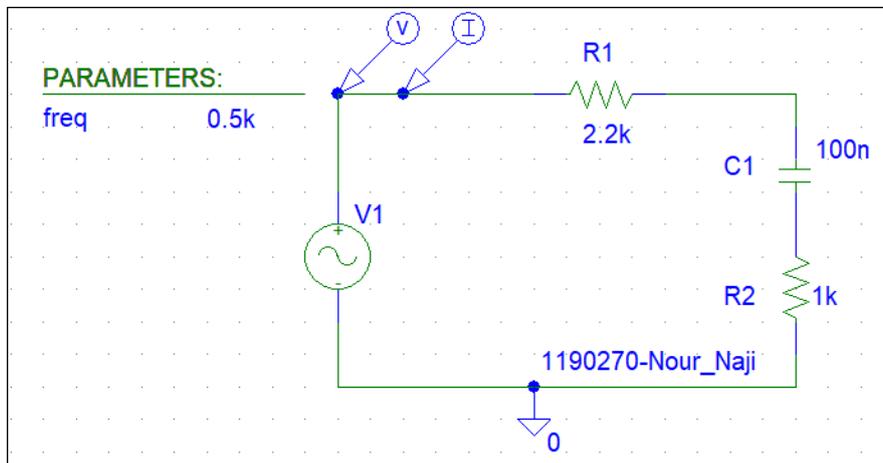


*Figure 1. 2.4.1*
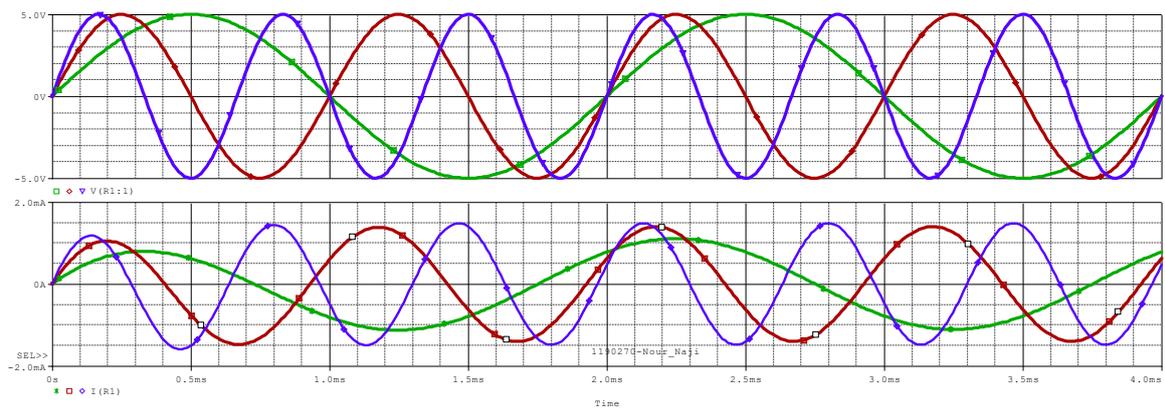


*Figure 1. 2.4.2*

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## 1.3   RL circuit

➔ Circuit using PSpice:
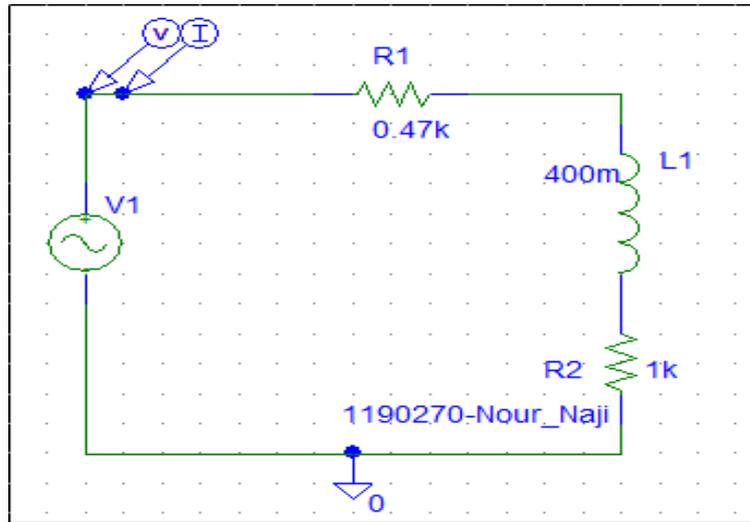


*Figure 1. 3.1*

## 1.3.1   Frequency = 1000 Hz
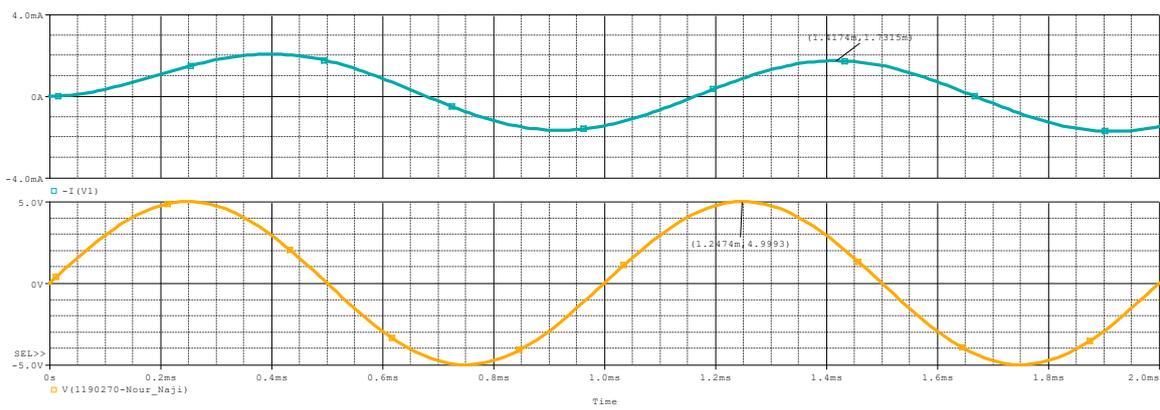


*Figure 1. 3.1.1*

## 1.3.2   Frequency = 500 Hz
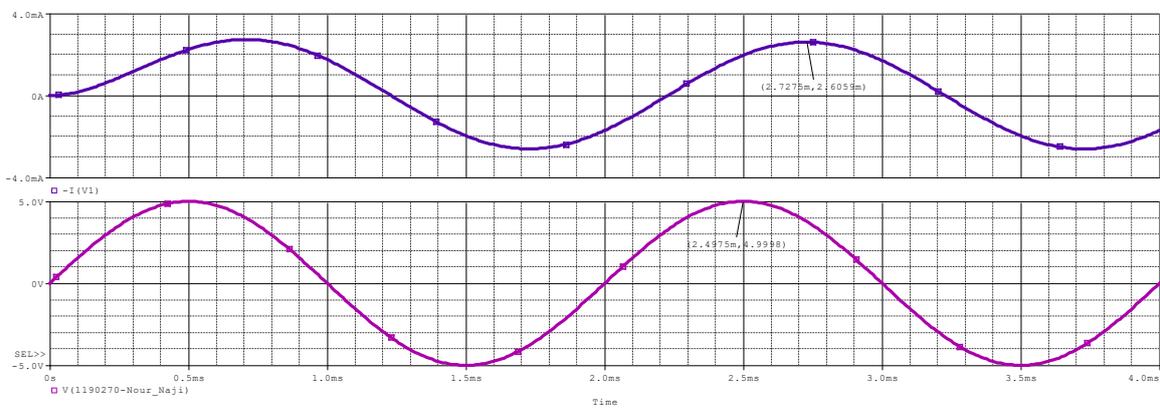


*Figure 1. 3.2.1*

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### 1.3.3  Frequency = 1500 Hz
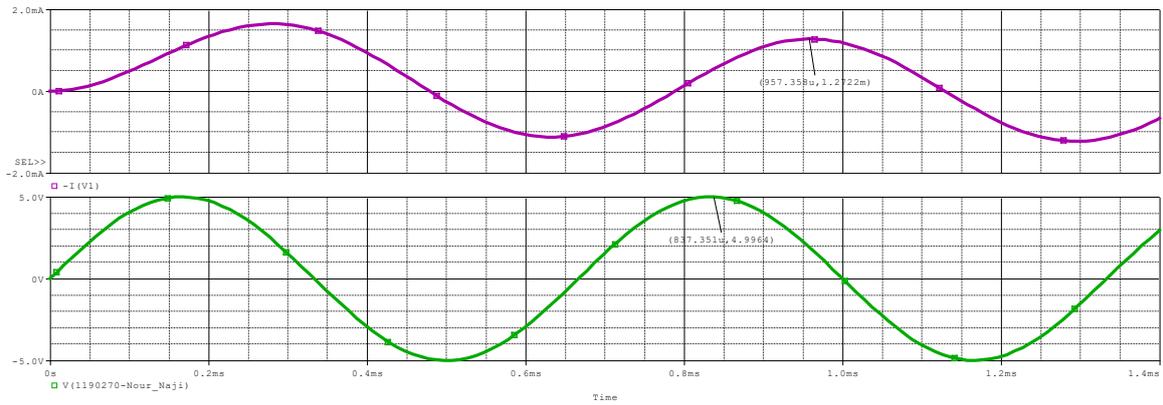


*Figure 1. 3.3.1*

### 1.3.4  All Frequencies
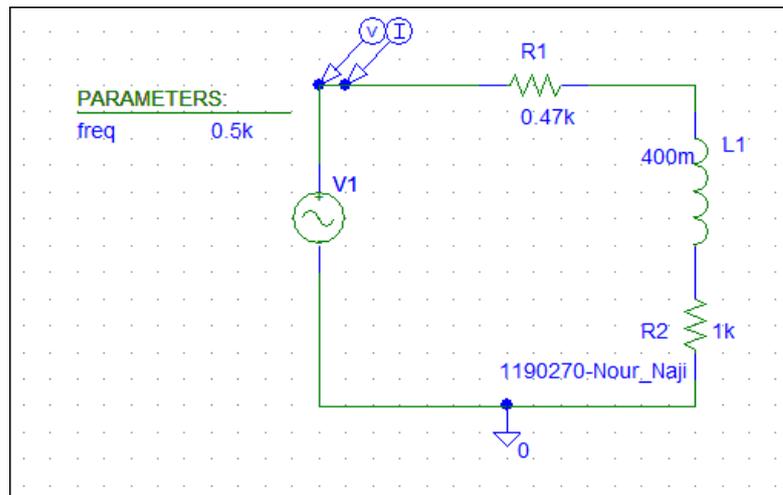


*Figure 1. 3.4.1*
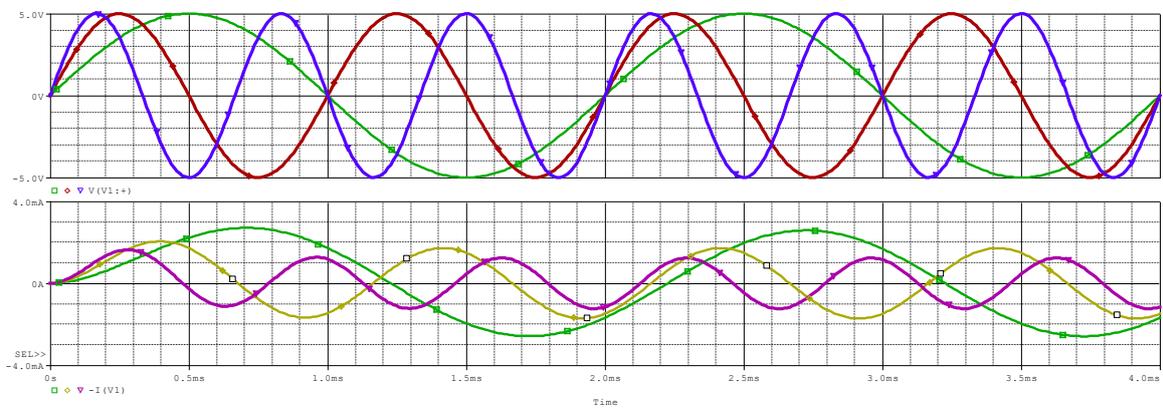


*Figure 1. 3.4.2*

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## 1.4   Capacitive and inductive behavior

➔ Circuit using PSpice:
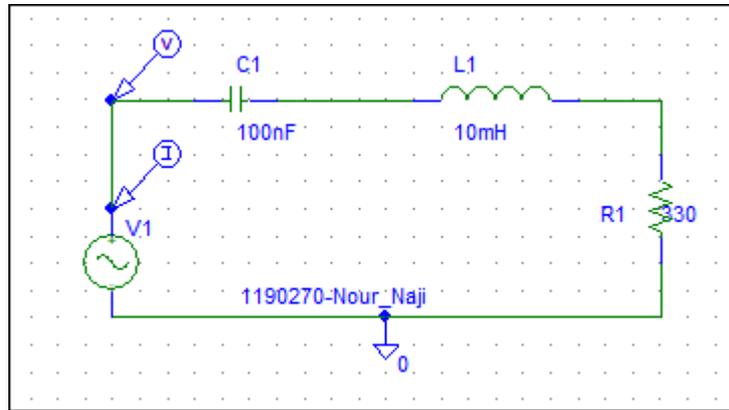


*Figure 1. 4.1*

➢ F=1KHZ
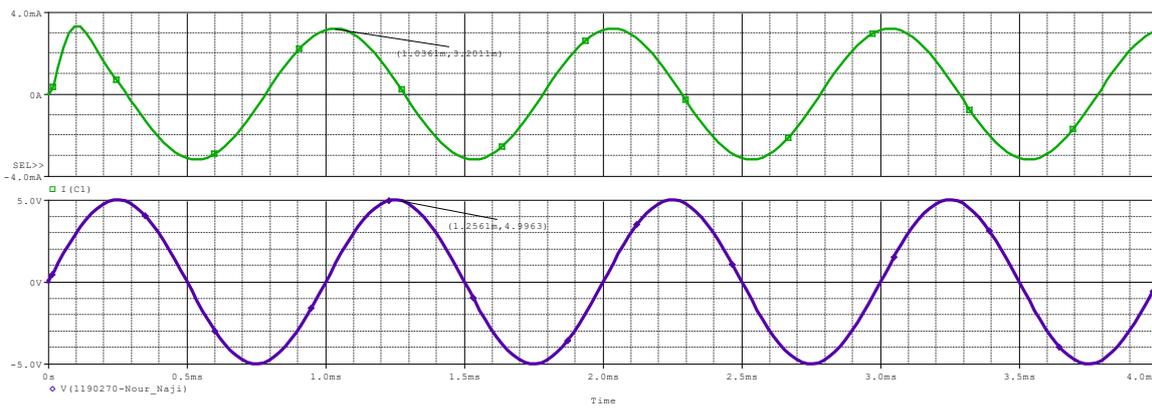


*Figure 1. 4.2*

➢ F = Fo (Resonance Frequency):



*Figure 1. 4.3*

F = 2Fo
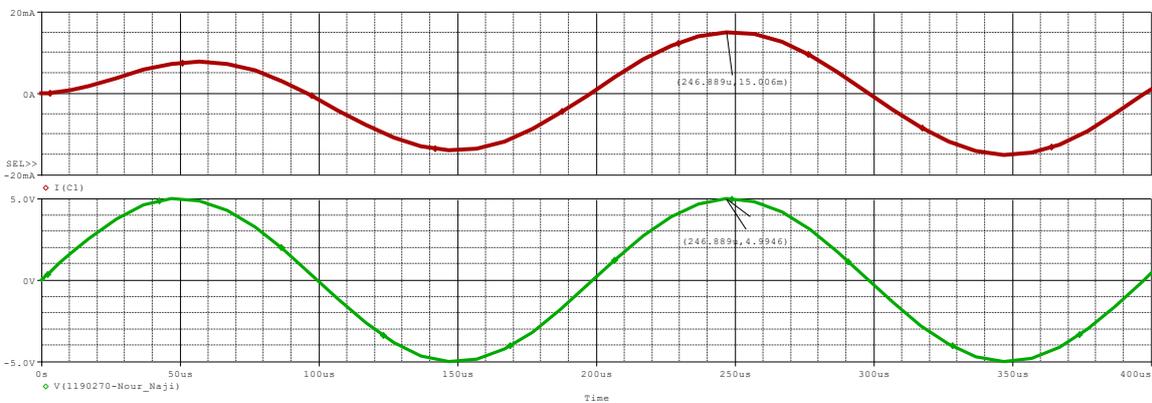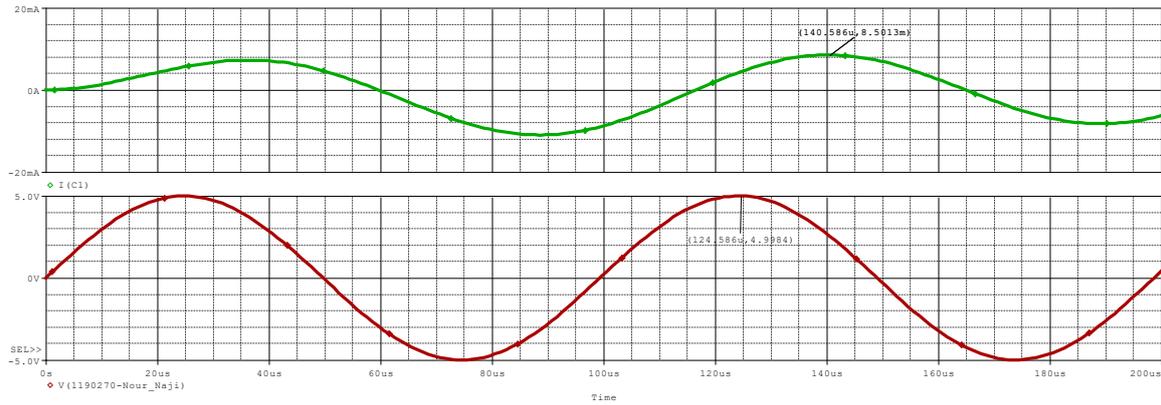


*Figure 1. 4..4*

## 1.4.1 Double the value of the capacitor:

→ Circuit using PSpice:
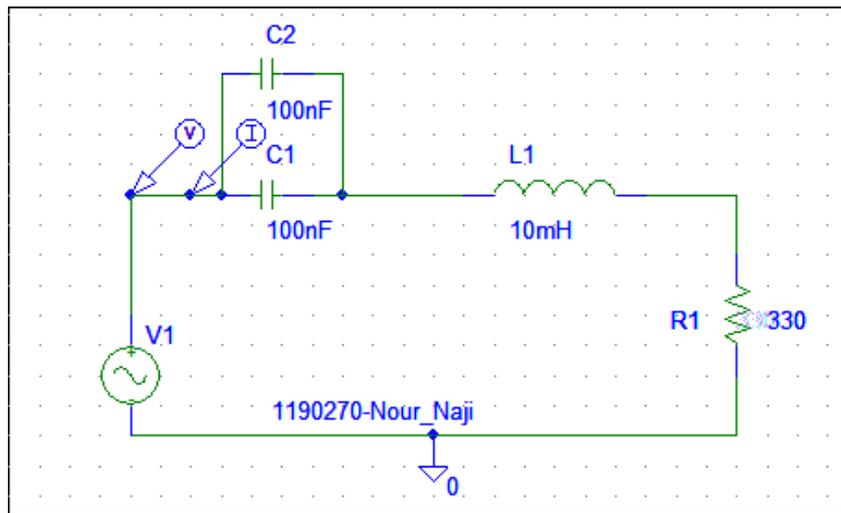


*Figure 1. 4.1.1*
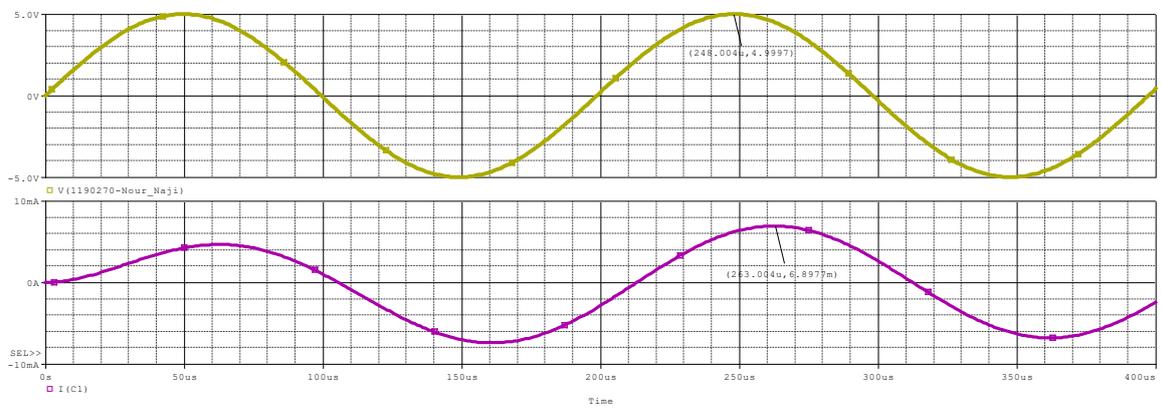


*Figure 1. 4.1.2*

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## 1.4.2 Double the value of the inductor

➔ Circuit using PSpice:
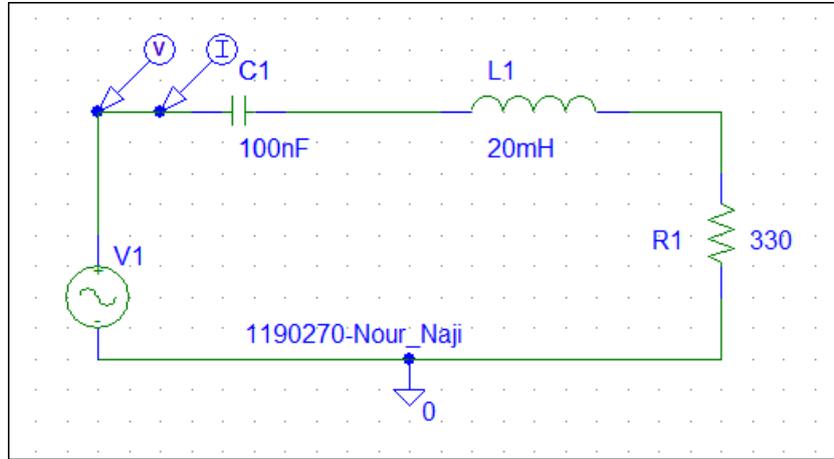


*Figure 1. 4.2.1*
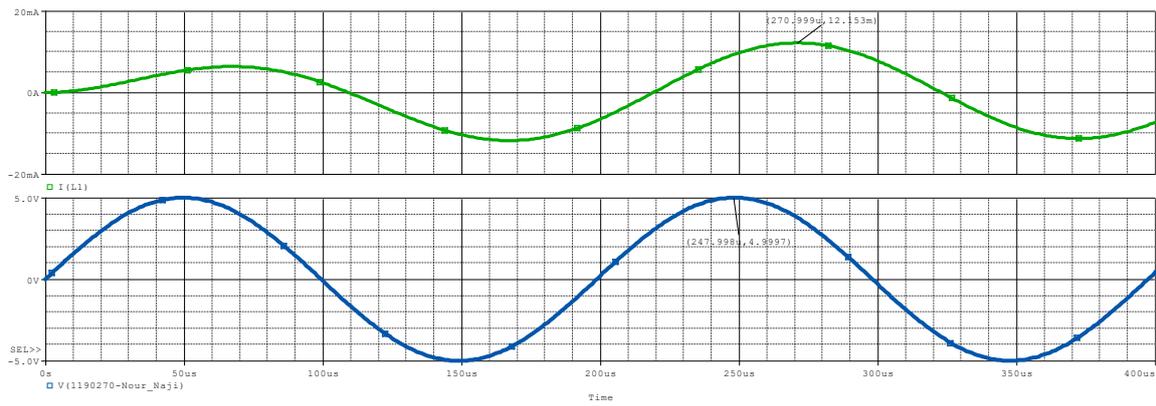


*Figure 1. 4.2.2*

## 1.5 Sinusoidal steady state power

➔ Circuit using PSpice:
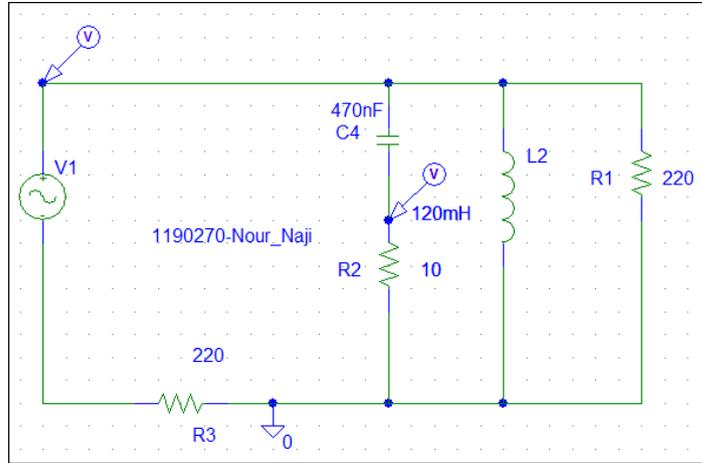


*Figure 1. 5.1*

Plot the voltage and current across R2
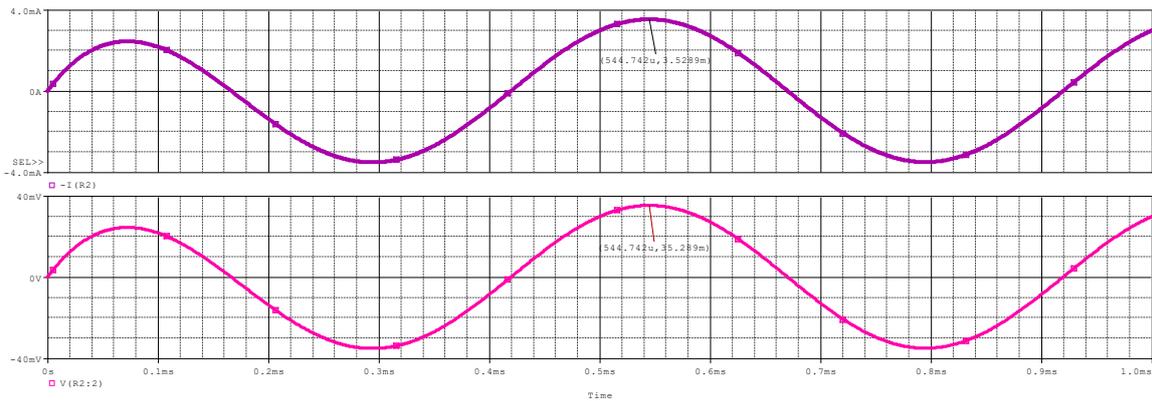


*Figure 1. 5.2*

Plot Vs and Is and measure phase shift
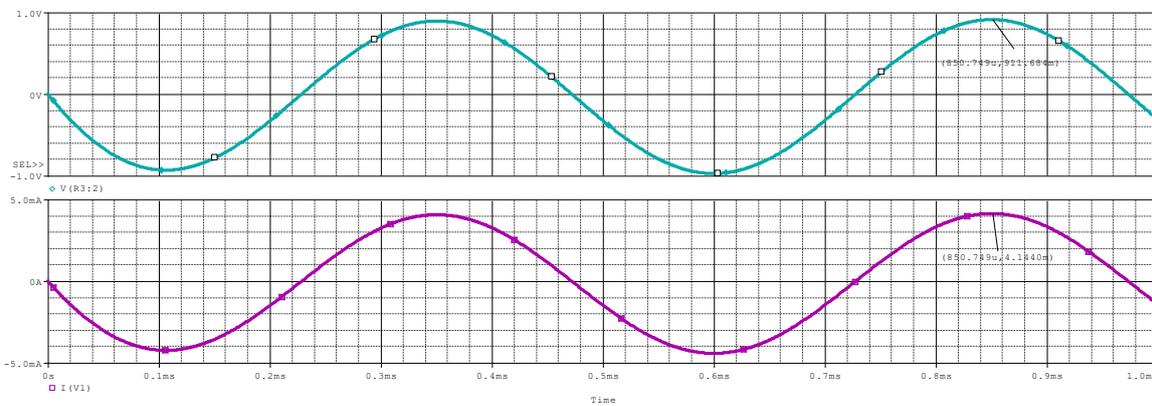


*Figure 1. 5.3*

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Plot Vc and Ic and measure phase shift
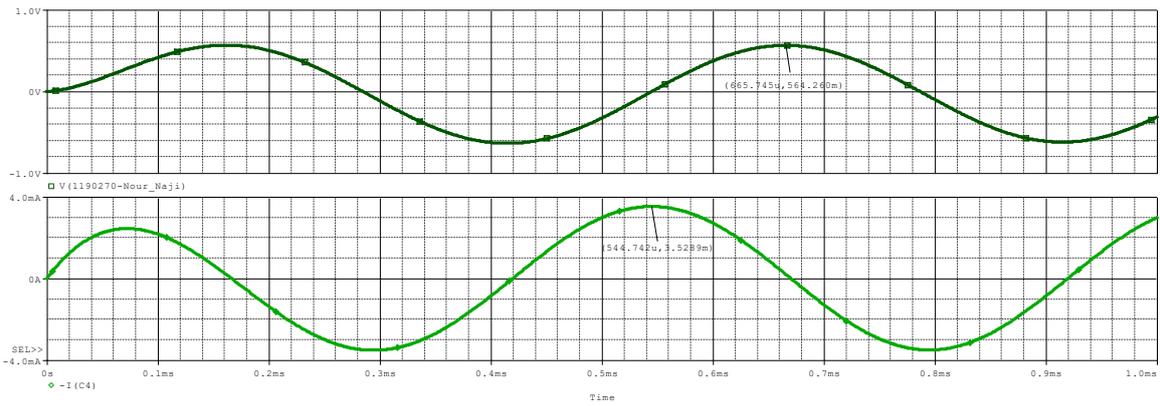


*Figure 1. 5.4*

Plot VL and IL and measure phase shift
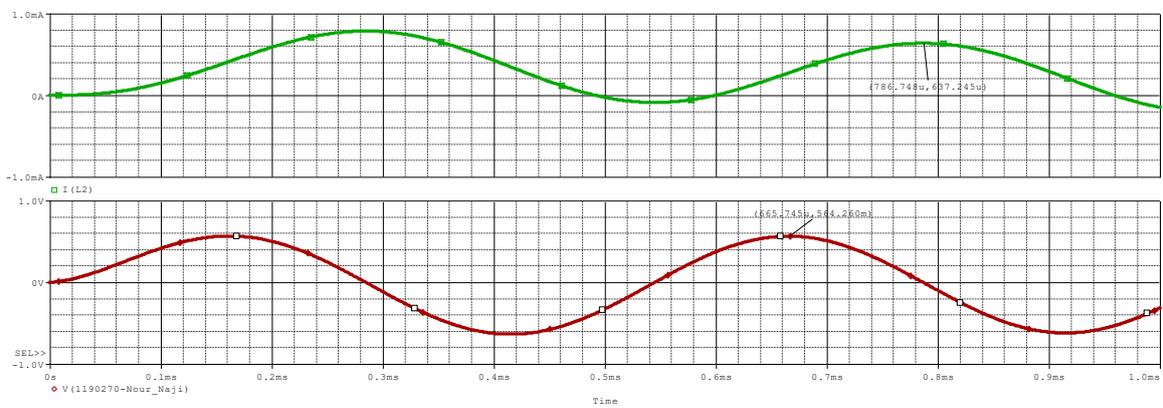


*Figure 1. 5.5*

Plot voltage across R1 and Is and measure phase shift



*Figure 1. 5.6*