# ELCN8005-21F-Sec1-Electronics Design Principles

- **Experiment:** Oscillator
- **Submitted by:**
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- **Date:** 19/10/2021

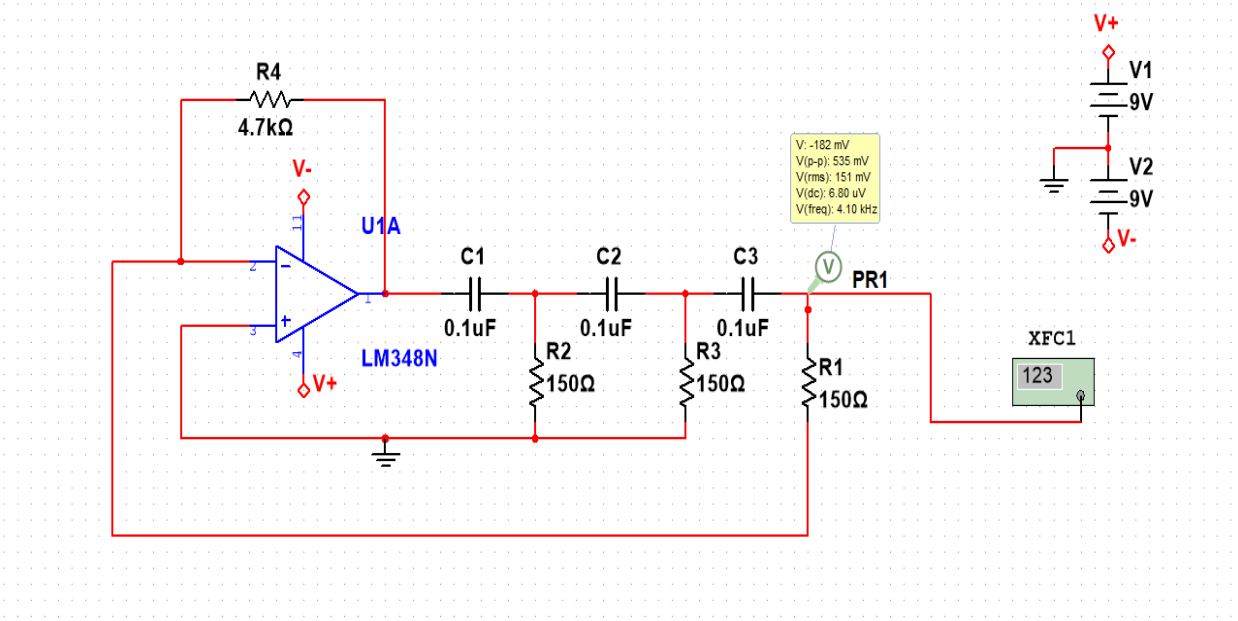
## OBJECTIVE:

- Design and build an Oscillator using one of the designs that is given in the theory class (Lesson 8).
- Please keep in mind that you need to build your circuit on the breadboard.

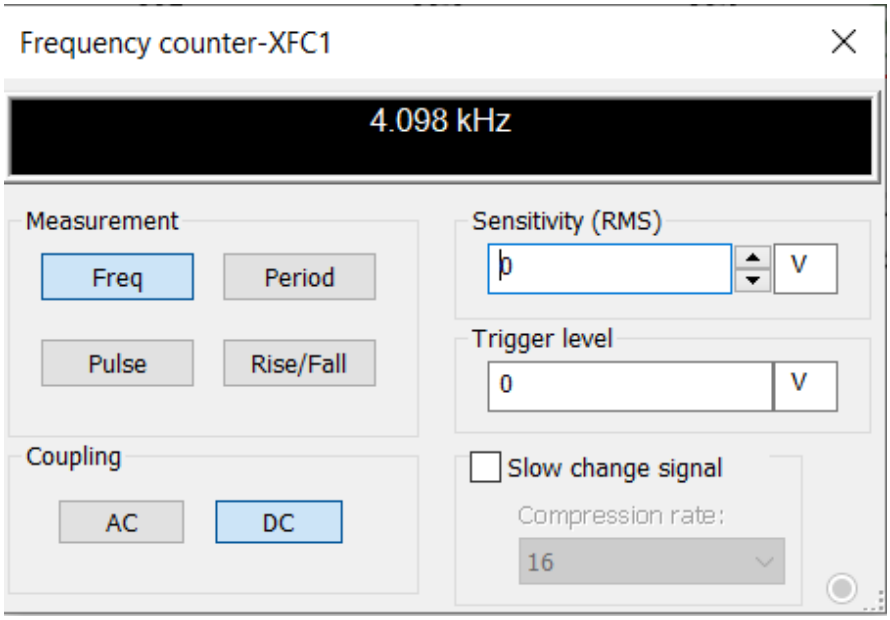
## EQUIPMENTS:

| Hardware | Software |
|---|---|
| LM348 – 1<br>Resistor – 4.7k,150<br>Capacitor – 0.1uf<br>Power supply – 9v<br>Multimeter – 1<br>Breadboard – 1 | Multisim |

## SCHEMATIC IN MULTISIM:



**OUTPUT:**




**CALCULATIONS:**

Building a phase shift oscillator that generated 4khz frequency.

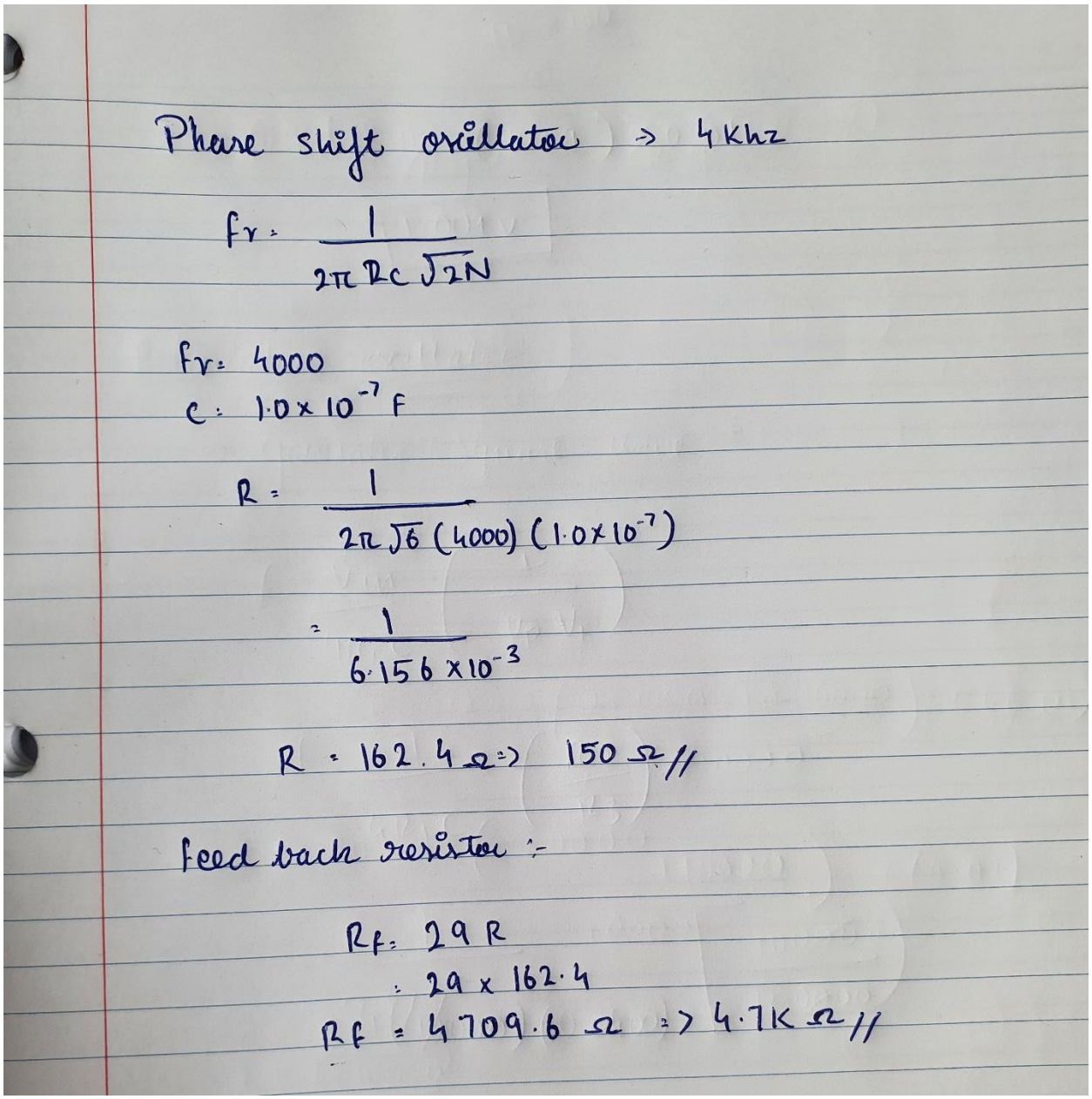
In this circuit capacitor value is 0.1uf.

Formula:

$$f_r = \frac{1}{2\pi RC\sqrt{2N}}$$

**Fr =** 4000

**C =** $1.0*10^{-7}$ F



Phase shift oscillator → 4 Khz

$$fr = \frac{1}{2\pi RC\sqrt{2N}}$$

$fr = 4000$

$C = 1.0 \times 10^{-7}\ F$

$$R = \frac{1}{2\pi\sqrt{6}\,(4000)\,(1.0\times10^{-7})}$$

$$= \frac{1}{6.156\times10^{-3}}$$

$R = 162.4\ \Omega \Rightarrow 150\ \Omega$ //

Feed back resistor :-

$Rf = 29R$

$= 29 \times 162.4$

$Rf = 4709.6\ \Omega \Rightarrow 4.7K\ \Omega$ //

**R =** 162.4 ohm

**Rf =** 4.6k ohm

## THEORY VS PRACTICAL:

| Theory Frequency | Practical Frequency | |
|---|---|---|
| | **Multisim** | **Breadbroad** |
| 4000 hz | 4098 hz | 3098 hz |

## CONCLUSION:

The RC phase shift oscillator the operational amplifier is worked at inverting mode. The op amp creates 180 degree phase shift as output. The RC feedback network creates 180 degree phase shift in combination to all the circuit creates 360 degree which is ideal for oscillator. Which is used to create desired frequency by adjusting the resistor and feedback resistor.

## DISCUSSION:

From performing this experiment, I am able to build the RC phase shift oscillator circuit in multi sim and breadboard. Understood the working principle of the phase shift oscillator.

**Reference:** https://www.electronics-tutorials.ws/oscillator/rc_oscillator.html