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Lab 8

Study the sinusoidal and non-sinusoidal oscillators using LM741

Objectives

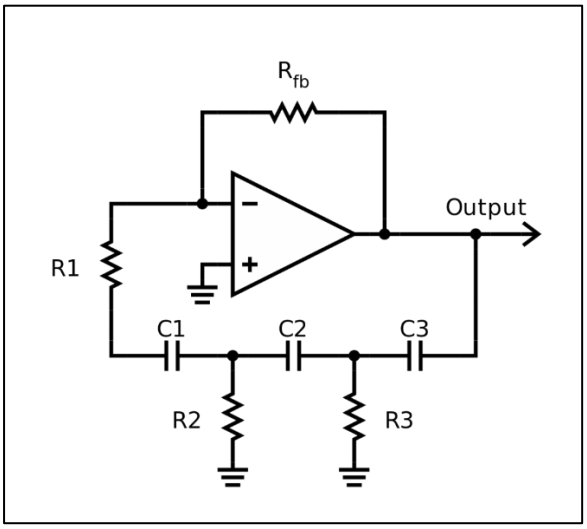
To study the sinusoidal and non-sinusoidal oscillators using op-amp IC LM741

1. RC phase shift oscillator
2. Wein Bridge oscillator

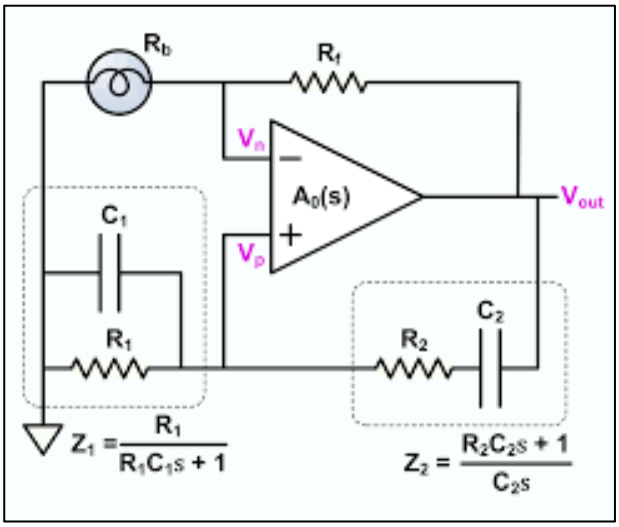
and draw output waveforms in each case.
Also draw the schematic for each filter and compare theoretical values with simulated ones.

Oscillator Circuits

An **oscillator** is a circuit which produces a continuous, repeated, alternating waveform without any input. Oscillators basically convert unidirectional current flow from a DC source into an alternating waveform which is of the desired frequency, as decided by its circuit components.



RC Phase Shift Oscillator

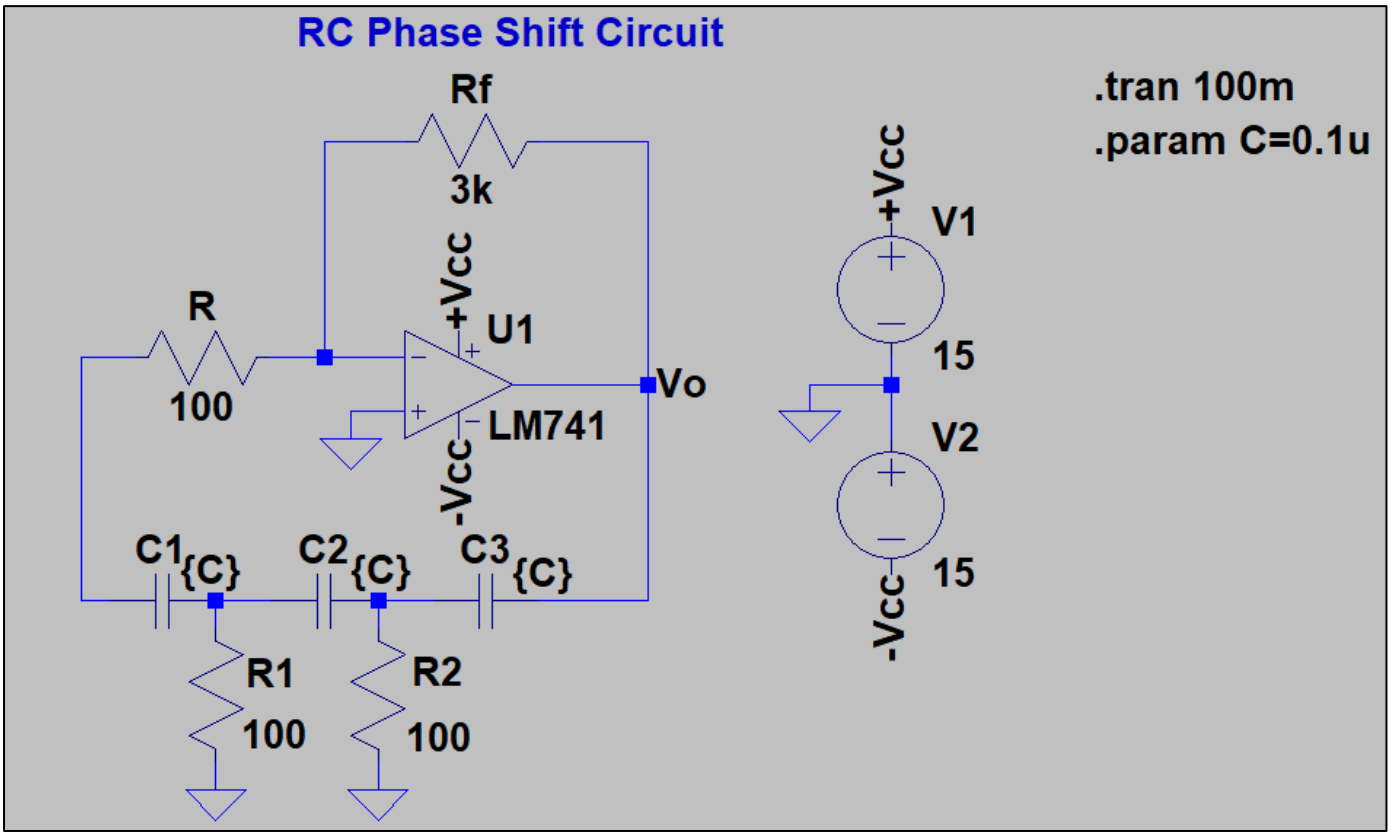


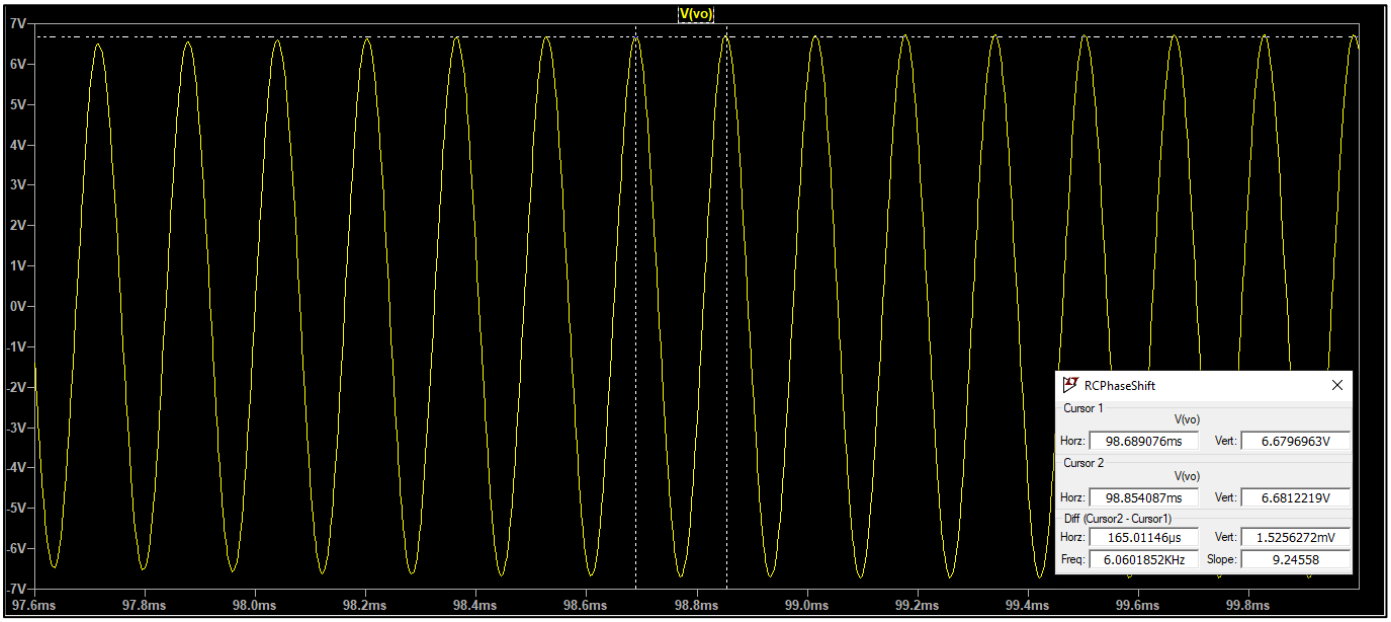
Wein Bridge Oscillator

1. RC Phase Shift Oscillator

C = 0.1µF

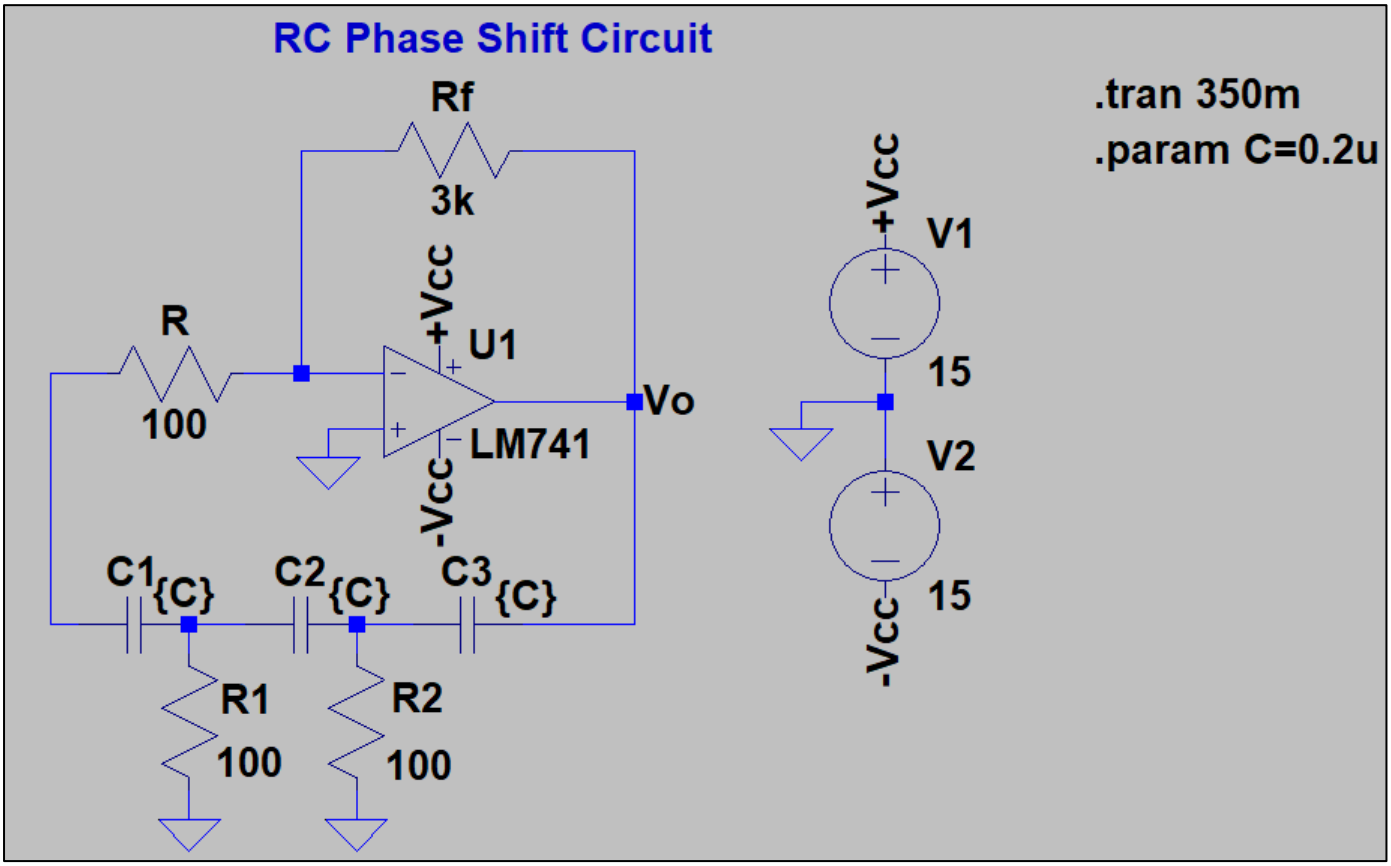
Schematic and Waveform

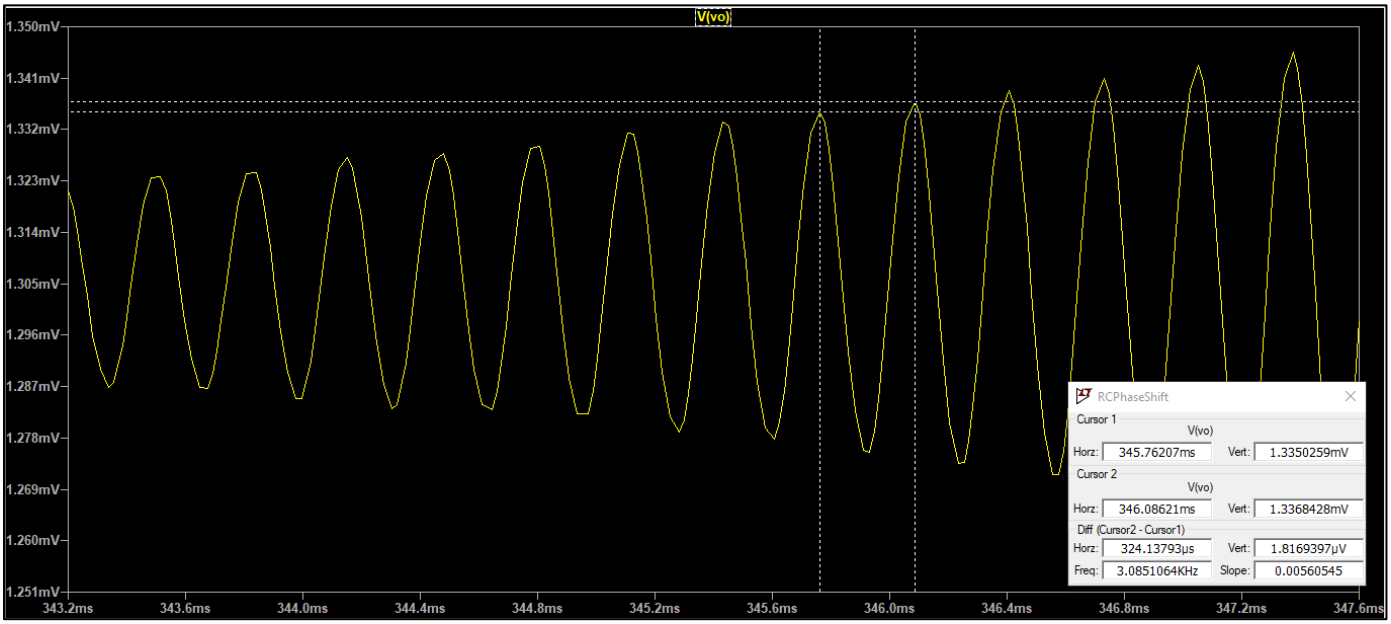




C = 0.2µF

Schematic and Waveform

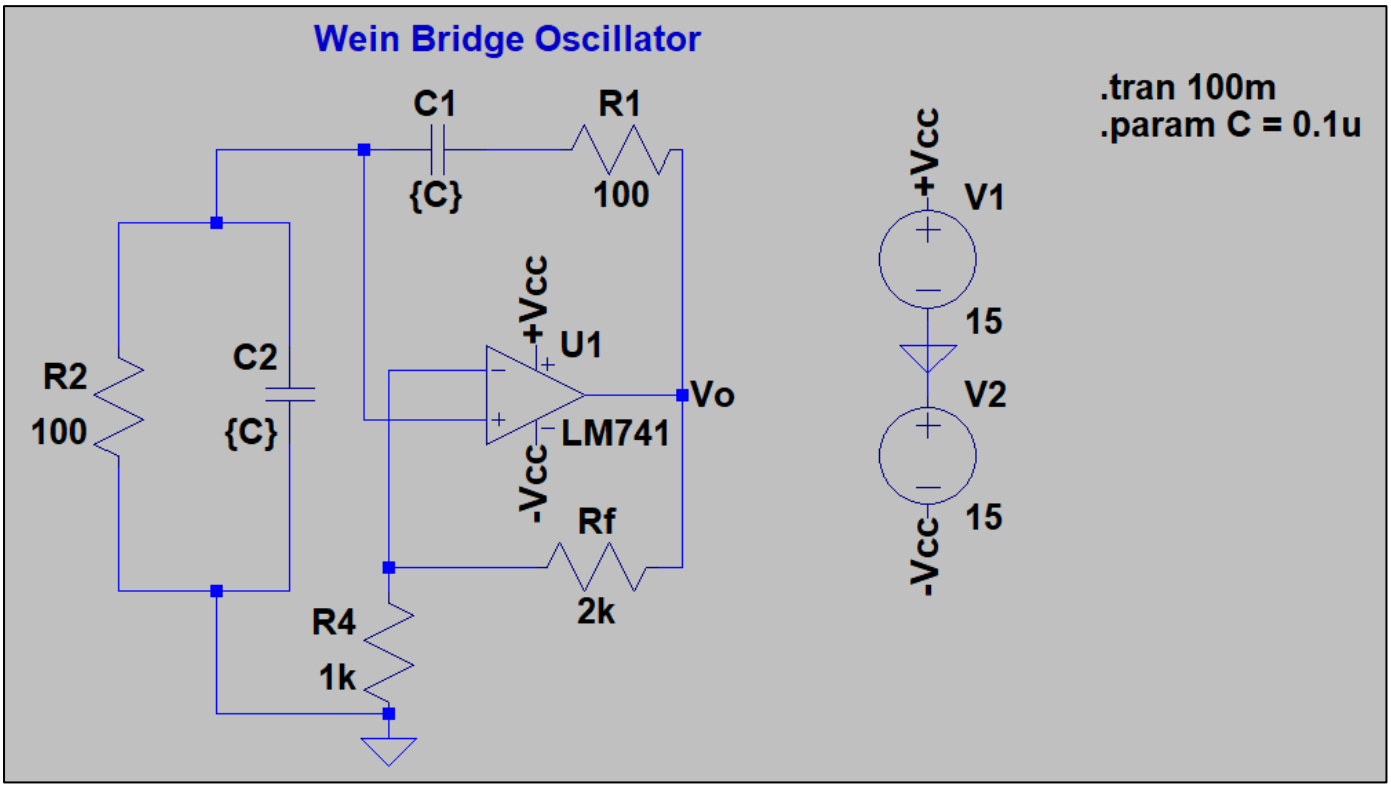


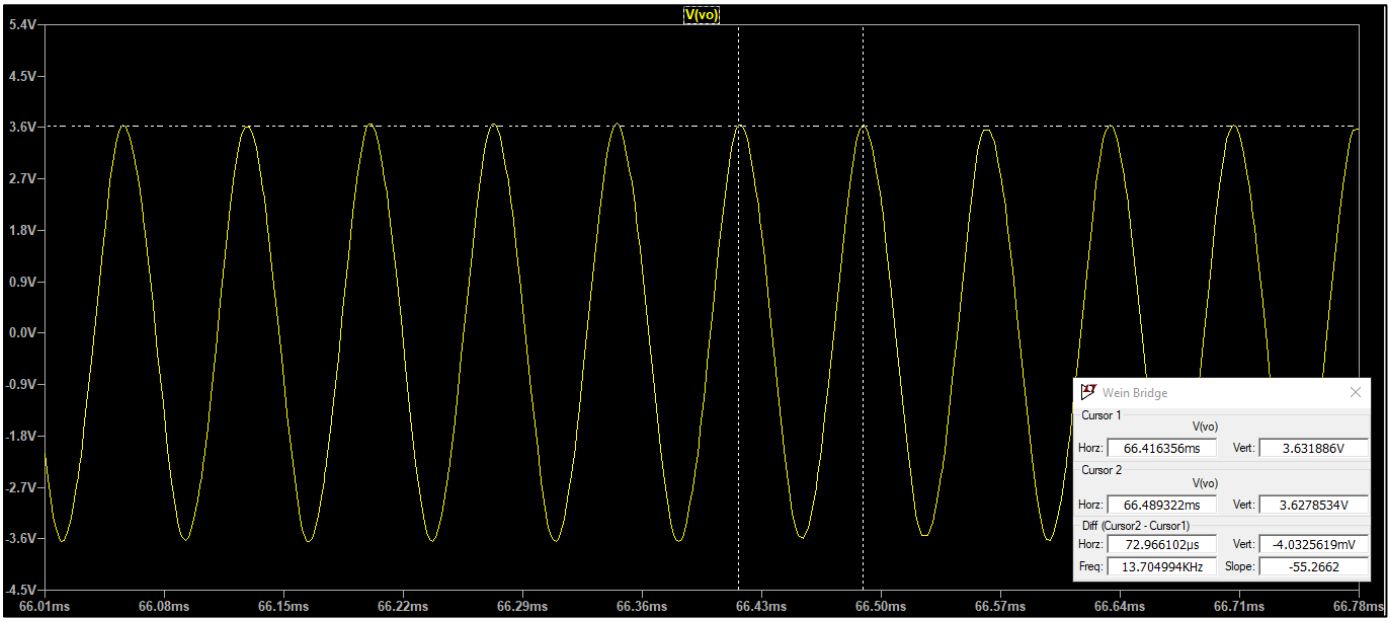


2. Wein Bridge Oscillator

C = 0.1µF

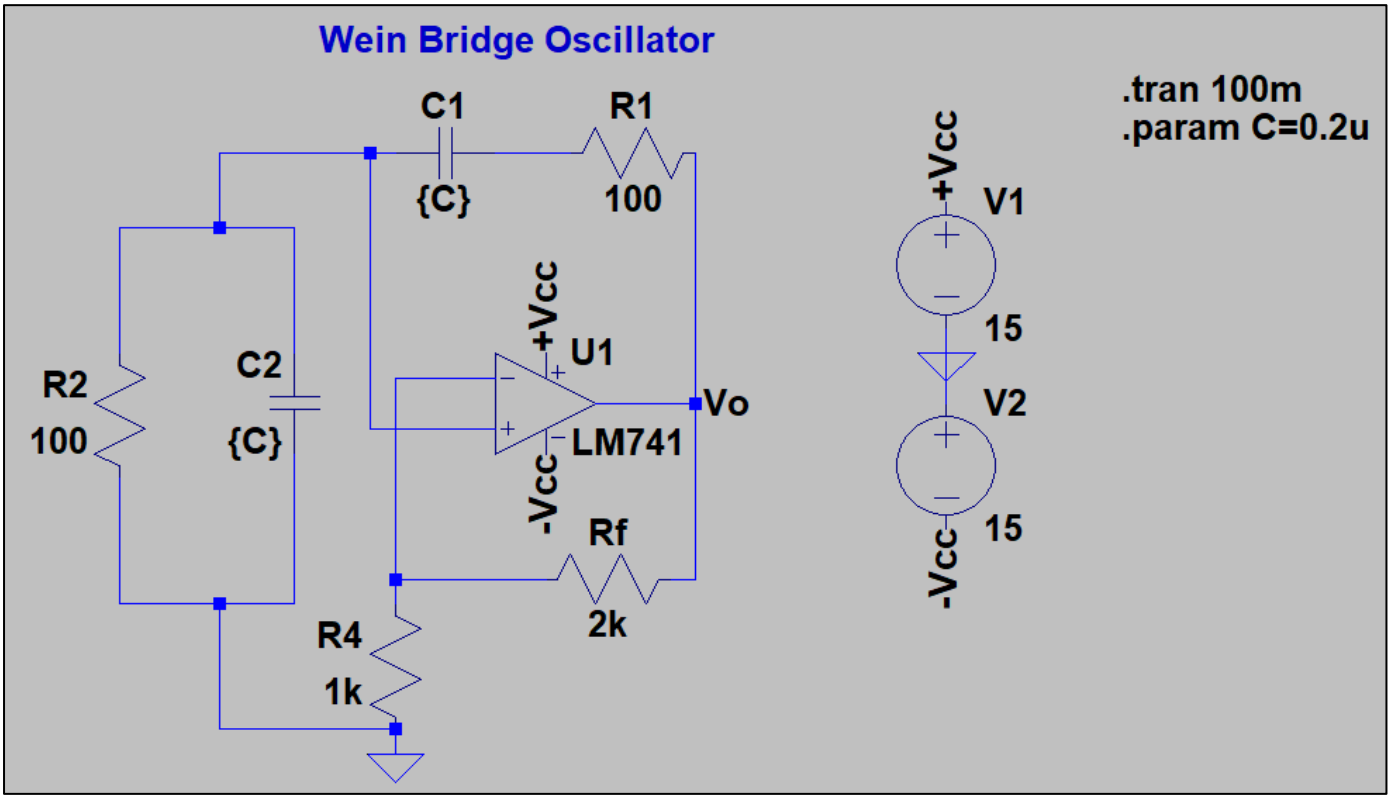
Schematic and Waveforms

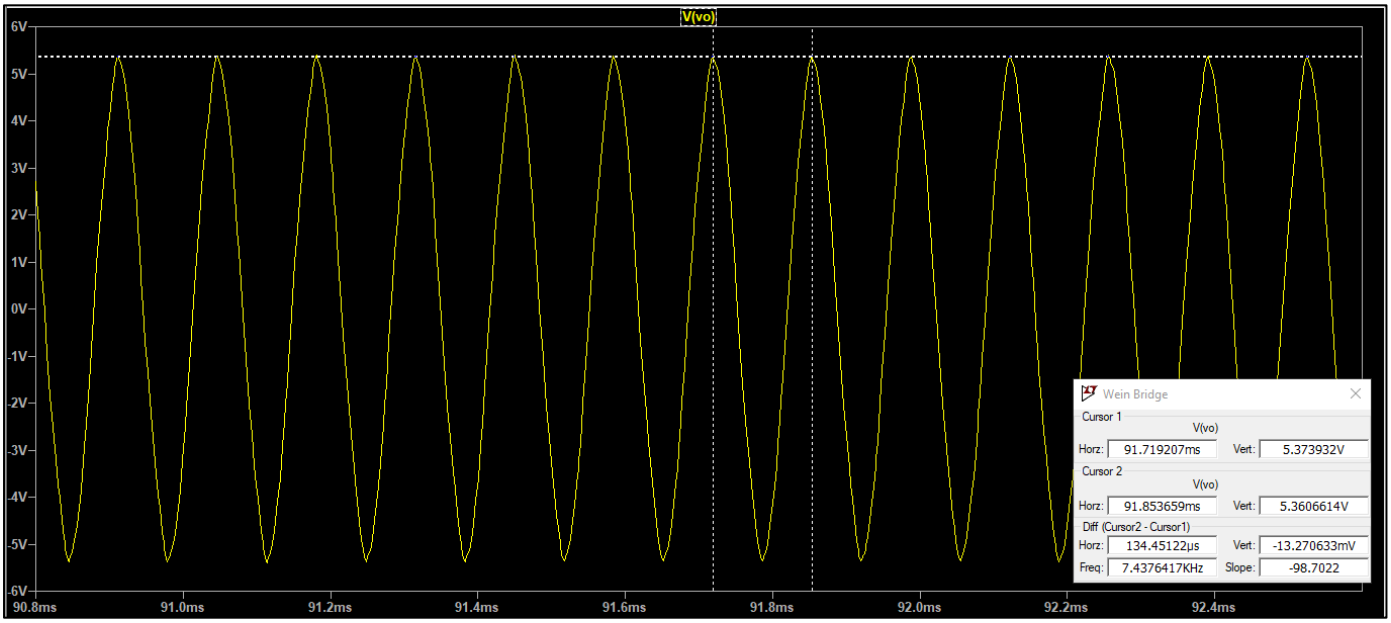




C = 0.2µF

Schematic and Waveforms





Results

Oscillator	Theoretical value of oscillator frequency	Best simulated value of oscillator frequency
RC phase shift oscillator C = 0.1uF	$\frac{1}{2\pi RC\sqrt{6}} = \frac{1}{2\pi \times 0.1\mu \times 100\sqrt{6}}$ $= 6.497$ kHz	6.060 kHz
RC phase shift oscillator C = 0.2uF	$\frac{1}{2\pi RC\sqrt{6}} = \frac{1}{2\pi \times 0.2\mu \times 100\sqrt{6}}$ $= 3.249$ kHz	3.085 kHz
Wein Bridge oscillator C= 0.1uF	$\frac{1}{2\pi RC} = \frac{1}{2\pi \times 0.1\mu \times 100}$ $= 15.915$ kHz	13.705 kHz
Wein Bridge oscillator C= 0.2uF	$\frac{1}{2\pi RC} = \frac{1}{2\pi \times 0.2\mu \times 100}$ $= 7.958$ kHz	7.437 kHz