Experiment No. 9

Active Filters

Objectives:

To understand the characteristics of low-pass, high pass, band pass and band stop active filters

Equipment/Components Required:

1. Op-Amp µA 741
2. Resistors
3. Capacitors
4. Regulated Power Supply
5. Digital Storage Oscilloscope
6. Arbitrary Function Generator

Steps:

1. Compute the cut off frequency of LPF, HPF and the band stop filter shown in Figure 1 with R_a = 8 kΩ, R_b = 2.2 kΩ, R_1= R_F = 1 kΩ, C_a=C_b=10 nF.

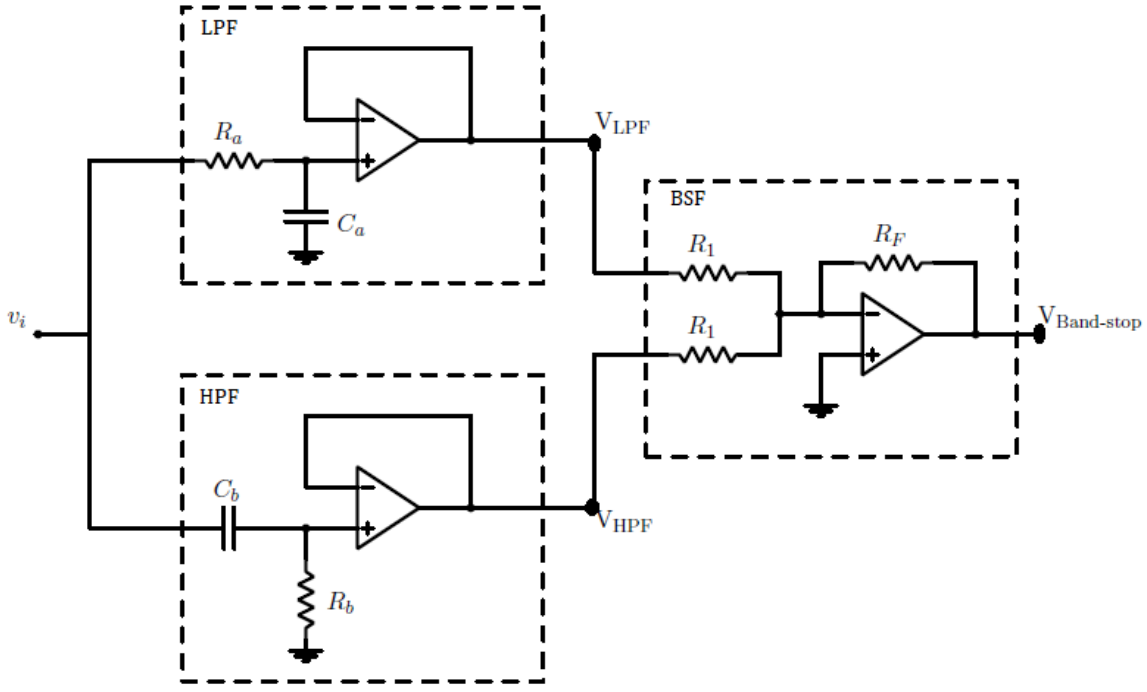

Figure 1: Circuit for Active Filters

2. Connect the circuit of the band-stop filter as shown in Figure 1. This circuit includes sub-circuits of a high pass filter, a low pass filter and an adder.

3. Apply a sinusoidal input having amplitude 100 mV, vary the frequency from 100 Hz to 100 KHz and observe the output of the low pass, high pass and band-pass outputs.

4. Plot the magnitude and phase response of all the three filters.

Freq.	V_i ($V_{p\text{-}p}$ V)	V_o ($V_{p\text{-}p}$ V)	Phase diff.

Band pass filter

- Compute the cut-off frequencies of the band pass filter shown in Figure 2. Given R_a=2.2 kΩ, R_b=22 kΩ and C_a=C_b=10 nF.

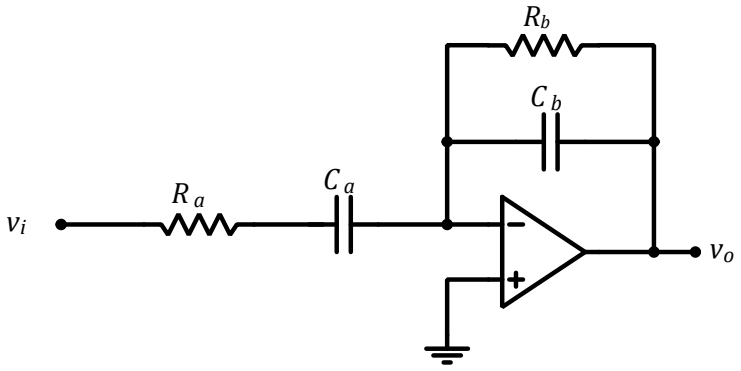

Figure 2: Circuit for a band-pass active filter.

- Apply a sinusoidal input having amplitude 100 mV, vary the frequency from 100 Hz to 100 kHz and observe the output.

- Plot the magnitude and phase response of the filter.

Band pass filter

Freq.	V_i ($V_{p\text{-}p}$ V)	V_o ($V_{p\text{-}p}$ V)	Phase diff.