Experiment 11
Experiment on Band Reject Filter

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1   Objective

1. To determine the Band reject filter frequency response of an RC circuit.

2. To measure the cut off frequency and observe the attenuation rate.

3. To compare the graph of simulation data and practical data.

2   Apparatus

1. Resistors

2. Capacitors

3. Oscilloscope

4. Breadboard

1. Wires

2. Function Generator

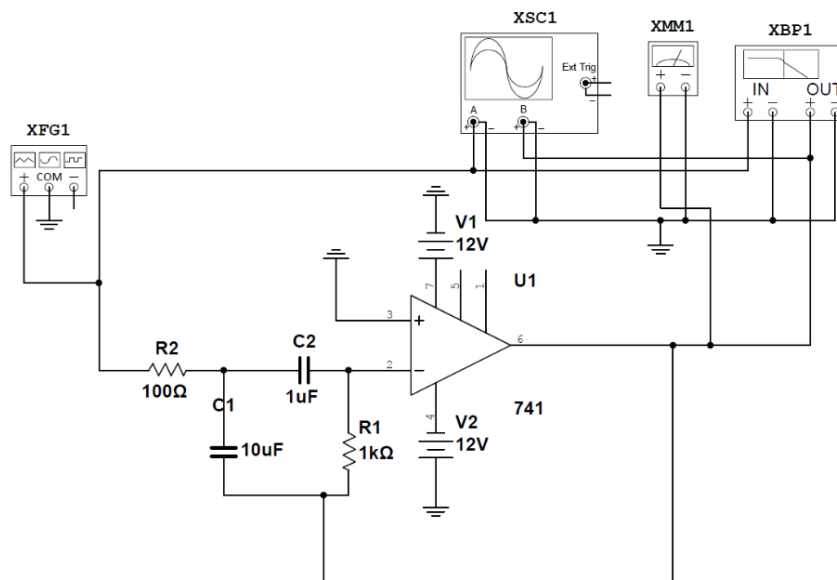3. DC Power Supply

4. Multimeter

3   Circuit Diagram

Figure 1: Band Reject Filter RC Circuit

4   Result Analysis

The bandstop filter is formed when a low pass filter and a high pass filter are connected in parallel with each other. The main function of the bandstop filter is eliminating or stopping the particular band of frequencies. The bandstop filter is also referred with some other names like band-reject or notch or band elimination filter. As discussed previously, For high pass filter there will be one cut off frequency, low pass filter also has one cut off frequency but this bandpass and bandstop filters have two cut off frequencies.

This band stop filter will reject a particular range of frequencies which are there in between the two cut off frequencies. It allows the frequencies which are above the high cut off frequency and the below the low cut off frequencies. These two cut off frequencies are determined based on the value of components used in the design of the circuit. This filter has a stopband and two passbands.

When the signal is given an input, a low pass filter allows the low frequencies to pass through the circuit and a high pass filter allows the high frequencies to pass through the circuit.

This is the block diagram of the bandstop filter. Low pass filter and high pass filter are connected in parallel. There is some difference between ideal and practical conditions while working with the filter. This difference is due to the switching mechanism of a capacitor. The frequency response can be clearly explained in the above figure.

The set of frequency for which the filter acts as a short circuit is depending on the lower and higher cut off frequencies. These cut off frequencies are dependent on the components and its value used while designing. According to the design, the transfer function determines the component values.

4.1   Data Table

Table 1: Practical Data of Band Reject Filter

| F	log F	Vin	Vout	Av
1.0	0.000000	2	0.033	-35.650321
1.5	0.176091	2	0.033	-35.650321
2.0	0.301030	2	0.330	-15.650321
2.5	0.397940	2	0.031	-36.193366
3.0	0.477121	2	0.031	-36.193366
3.5	0.544068	2	0.031	-36.193366
4.0	0.602060	2	0.032	-35.917600
4.5	0.653213	2	0.032	-35.917600
5.0	0.698970	2	0.032	-35.917600
5.5	0.740363	2	0.035	-35.139239
6.0	0.778151	2	0.400	-13.979400
6.5	0.812913	2	0.710	-8.995433
7.0	0.845098	2	0.159	-21.992657
7.5	0.875061	2	0.238	-18.489061
8.0	0.903090	2	0.278	-17.139704
8.5	0.929419	2	0.312	-16.137508
9.0	0.954243	2	0.372	-14.609741
10.0	1.000000	2	0.650	-9.762333
20.0	1.301030	2	0.794	-8.024190
30.0	1.477121	2	0.886	-7.071925
40.0	1.602060	2	0.951	-6.456990
50.0	1.698970	2	0.988	-6.125461
60.0	1.778151	2	1.031	-5.755427
100.0	2.000000	2	1.239	-4.159174
500.0	2.698970	2	1.241	-4.145164
1000.0	3.000000	2	1.222	-4.279176
5000.0	3.698970	2	1.189	-4.516963
10000.0	4.000000	2	1.140	-4.882503
20000.0	4.301030	2	1.104	-5.161218
30000.0	4.477121	2	1.063	-5.489935
40000.0	4.602060	2	1.017	-5.874181
50000.0	4.698970	2	0.740	-8.635966
100000.0	5.000000	2	0.448	-12.995040
200000.0	5.301030	2	0.176	-21.110347
300000.0	5.477121	2	0.070	-29.118639
400000.0	5.602060	2	0.040	-33.979400
500000.0	5.698970	2	0.035	-35.139239
1000000.0	6.000000	2	0.056	-31.056839
2000000.0	6.301030	2	0.450	-12.956350
3000000.0	6.477121	2	0.450	-12.956350
5000000.0	6.698970	2	0.450	-12.956350

4.2 Graph
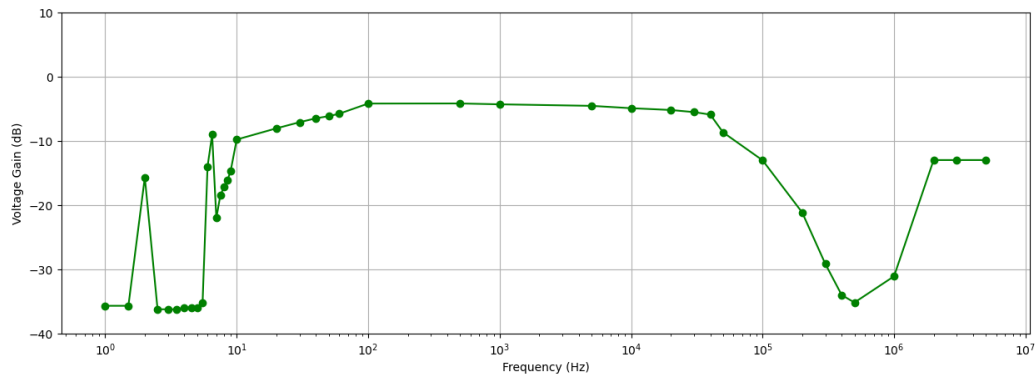
Figure 2: Frequency Response of Band Reject Filter

In this graph we were seen that at the low frequency the the gain was highest .After increasing the frequency randomly we were seen that this graph block the highier frequency and pass the lower frequency and then after more increasing the frequency we were seen that after suuden time the graph was decrease by increasing the frequency and then after sudden time the filter look like the high pass filter.And that was condition of Band reject filter.

5 Discussion

The bandstop filter is formed when a low pass filter and a high pass filter are connected in parallel with each other. The main function of the bandstop filter is eliminating or stopping the particular band of frequencies. The bandstop filter is also referred with some other names like band-reject or notch or band elimination filter. As discussed previously, For high pass filter there will be one cut off frequency, low pass filter also has one cut off frequency but this bandpass and bandstop filters have two cut off frequencies.