Experiment -08

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AIM: Single Side band (SSB-SC) Modulation Scheme.

APPARATUS: MATLAB

THEORY:

1. Modulation : Modulation is a process, by which some characteristic of a carrier wave is varied in accordance with a modulating (message) signal.

2. Analog modulation : It is a kind of modulation, where the message signal and the carrier wave both are analog in nature.

3. Single Side Band (SSB-SC) modulation :

- SSB-SC is a type of Amplitude Modulation.
- In conventional A.M. we have two side band and the one carrier wave (no information is contained by the carrier).
- In SSB-SC modulation, only one side band is transmitted because both USB (upper side band) and LSB (lower side band) having the same information.
- Therefore the transmission bandwidth is reduced to half and also required less power compare to other method of A.M..

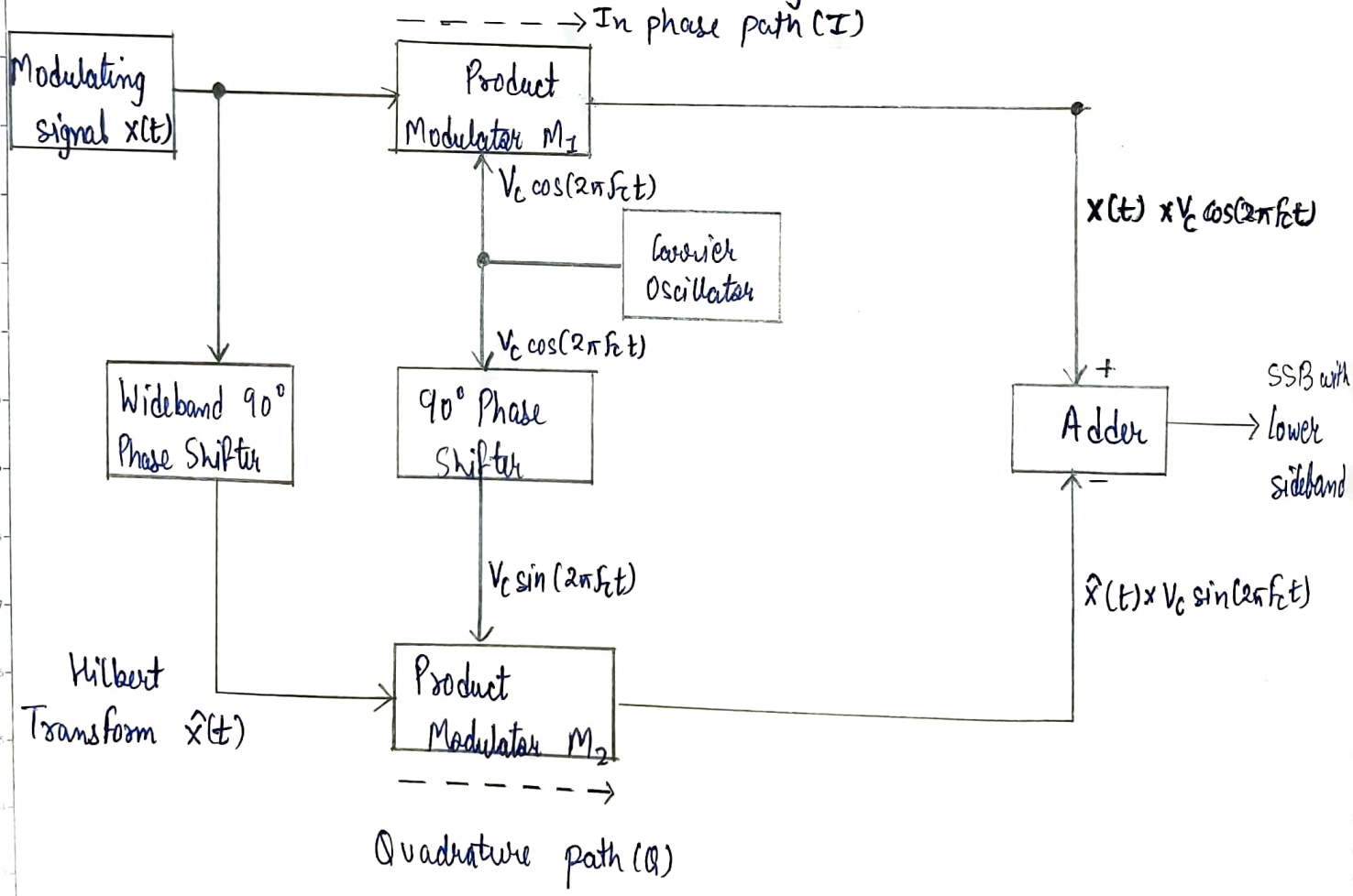
4. There are two method of generation of SSB-SC:

1. Frequency discrimination method
2. Hilbert transform method or Phase discrimination method.

Analog Modulation Methods

- Amplitude modulation
  - Single-sideband suppressed carrier (SSB)
  - Double-sideband suppressed carrier (DSB-SC)
- Frequency modulation
- Phase modulation

Generation of SSB-SC : By Hilbert transform method



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AIM :

5. Applications:

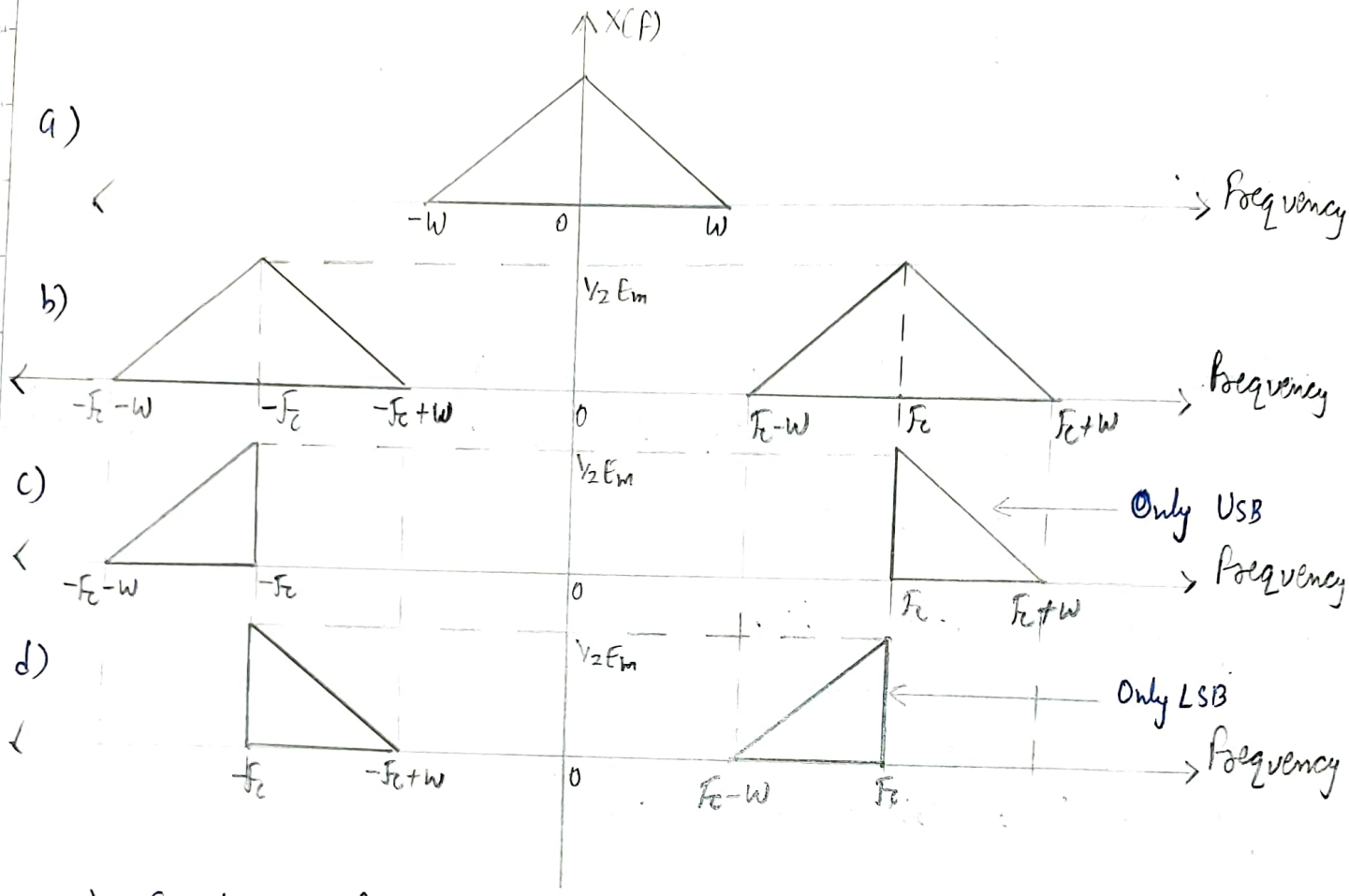
→ In point-to-point communication.

→ Radar communication.

→ Where the power saving and low bandwidth requirements are important.

→ In many voice application.

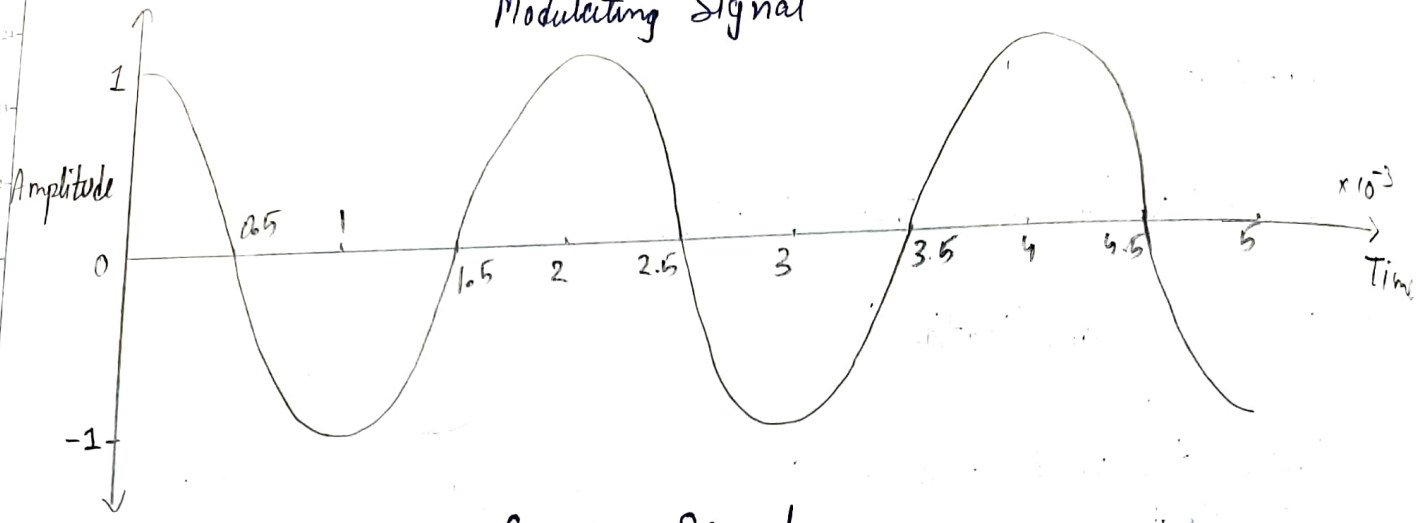
Expected Result



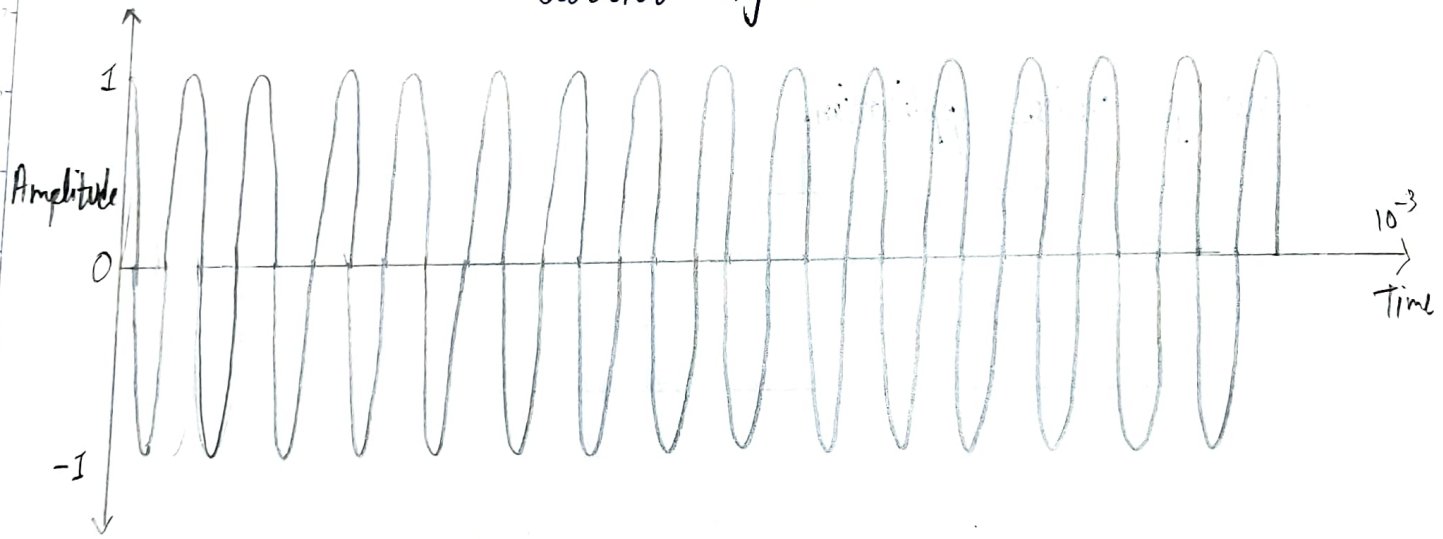
a) Spectrum of message signal.
b) Spectrum of DSB-SC Wave
c) Spectrum of DSB-SC with only USB transmitter
d) Spectrum of DSB-SC with only LSB transmitter.

SSB-SC Modulation Scheme.

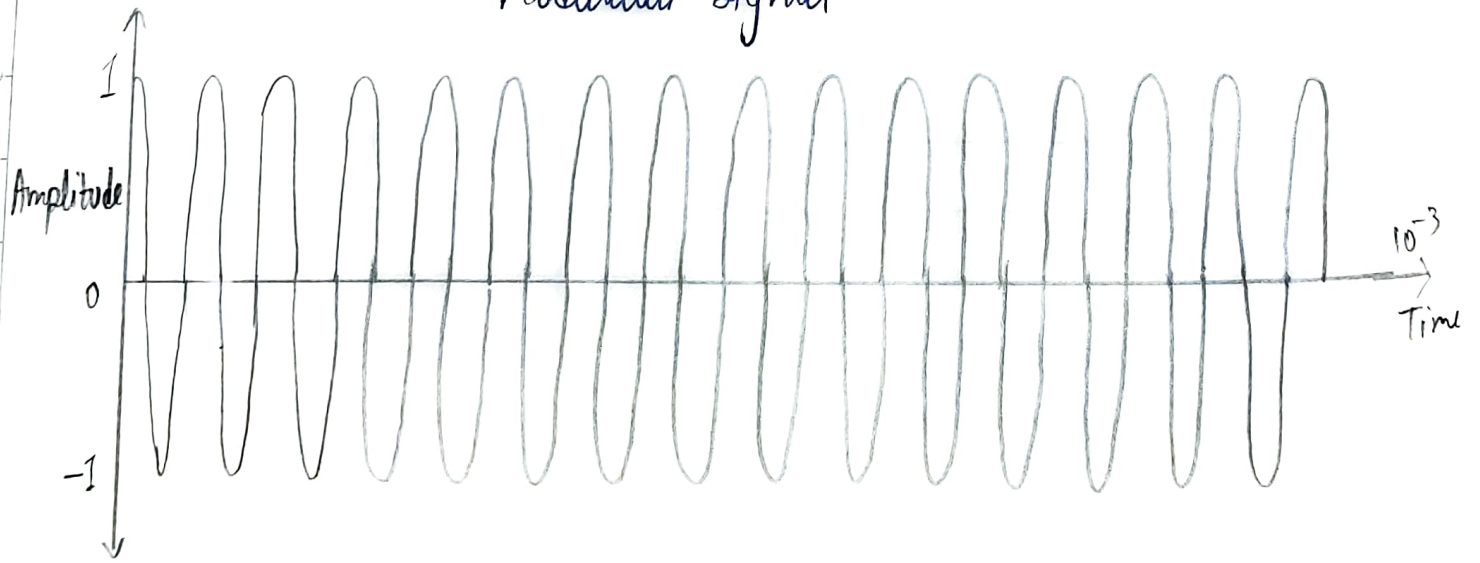
Modulating Signal



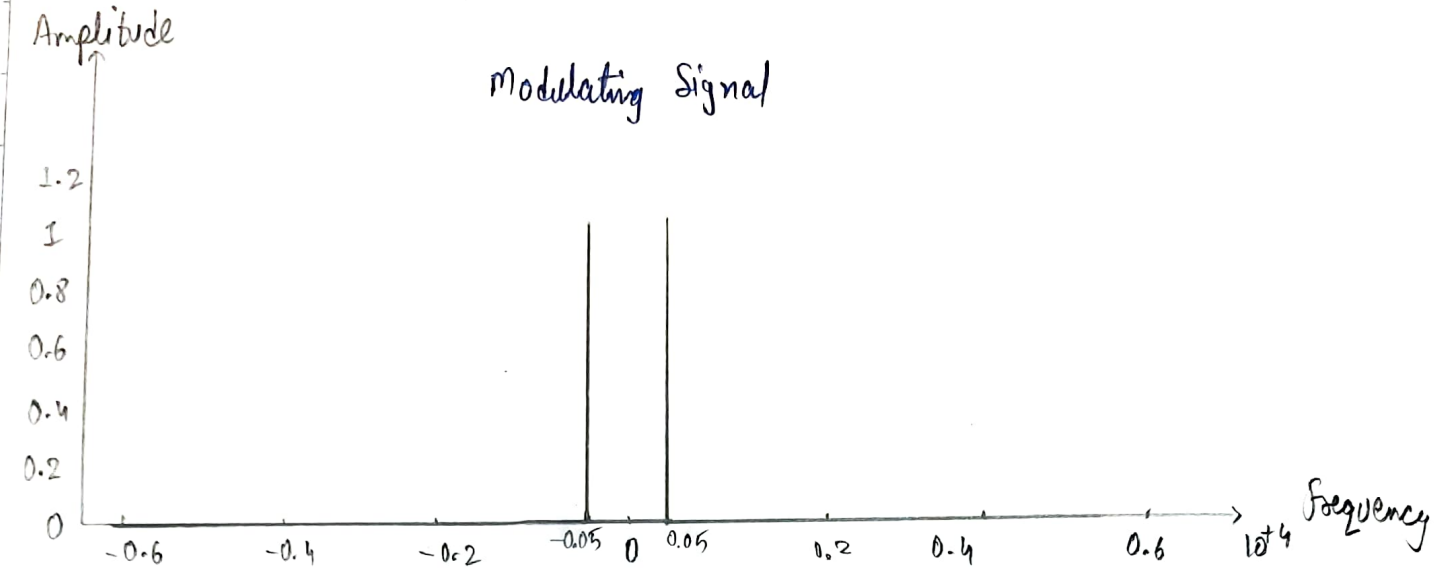
Carrier Signal

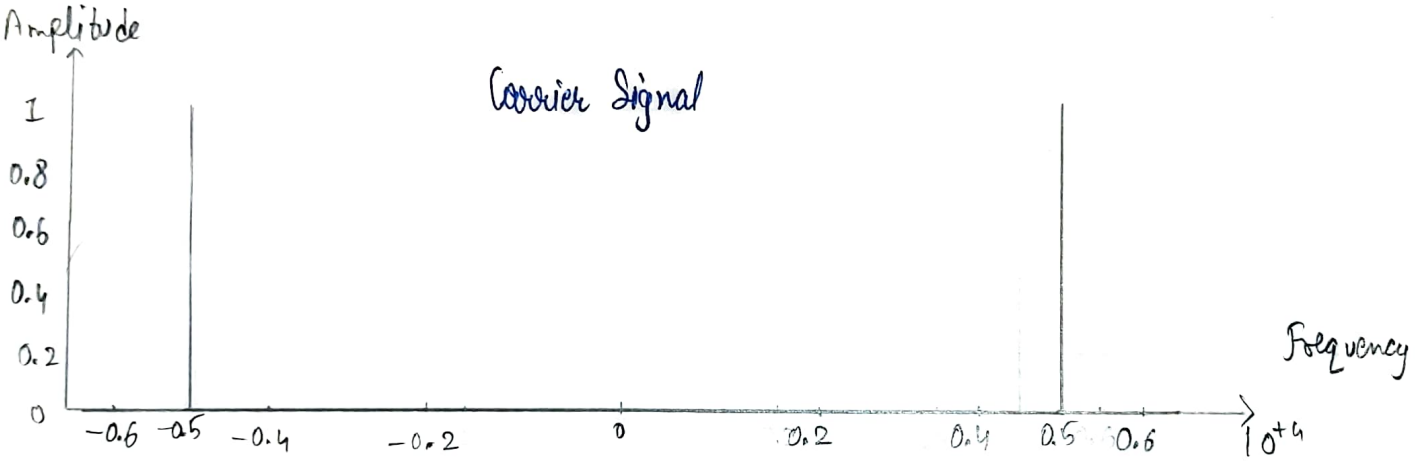


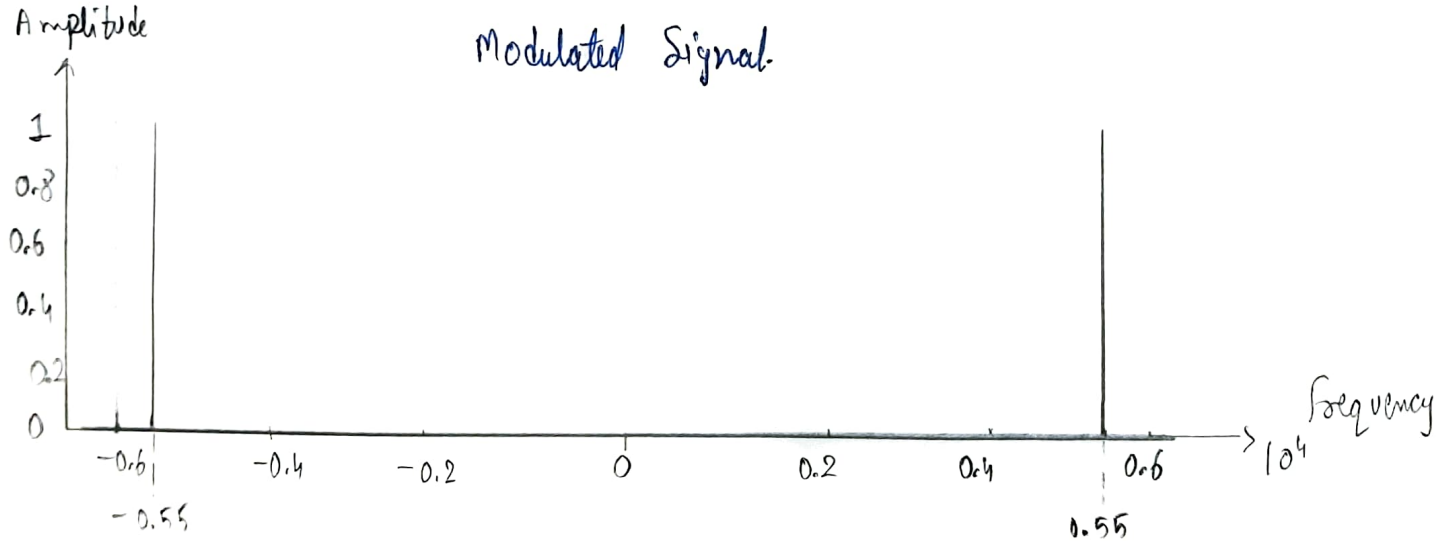
Modulated Signal



Spectrums


Amplitude
Modulating Signal
1.2
1
0.8
0.6
0.4
0.2
0
-0.6
-0.4
-0.2
-0.05
0
0.05
0.2
0.4
0.6
10^4
Frequency


Amplitude
Carrier Signal
1
0.8
0.6
0.4
0.2
0
-0.6
-0.5
-0.4
-0.2
0
0.2
0.4
0.5
0.6
10^4
Frequency


Amplitude
Modulated Signal
1
0.8
0.6
0.4
0.2
0
-0.6
-0.55
-0.4
-0.2
0
0.2
0.4
0.55
0.6
10^4
Frequency

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AIM :

CONCLUSION: We successfully observed Single Side band (SSB - SC) Modulation Scheme. and as we come to know that here low Bandwidth is required for transmission. Hence, We also save Power.