

Experiment–3

Aim:	
To study and generate single side band (SSB) using MATLAB	
Description:	
MATLAB software with essential configurations.	
Theory:	
Single Sideband Suppressed Carrier (SSBSC) modulation is a technique where only one sideband, along with the carrier, is transmitted while the other sideband and carrier are suppressed. This method effectively reduces bandwidth usage compared to double-sideband modulation, making it more spectrally efficient. At the receiver, the carrier is recovered, and the single sideband is demodulated to retrieve the original message signal. SSBSC modulation is commonly used in radio communications, especially for long-distance transmission, where bandwidth conservation is crucial. Overall, SSBSC modulation offers improved spectral efficiency and reduced interference, enhancing the performance of communication systems.	
Code:	
1	<i>% to generate ssb using phase method and detection of ssb signal using</i>
2	<i>% matlab</i>
3	close all
4	clear all
5	clc
6	fs = 8000;
7	fm =20;
8	fc = 50;
9	Am = 1;
10	Ac =1;
11	t=[0:0.1*fs]/fs;
12	subplot(5,1,1);
13	m1 = Am * cos(2 * pi * fm * t);
14	plot(t, m1);
15	title('Message Signal');
16	xlabel('Time (s)');
17	ylabel('Amplitude');
18	m2 = Am*sin(2*pi*fm*t);
19	subplot(5,1,2)
20	c1=Ac*cos(2*pi*fc*t);
21	plot(t,c1);
22	title('Carrier Signal');
23	c2=Ac*sin(2*pi*fc*t);
24	subplot(5,1,3)
25	S_usb = 0.5*m1.*c1-0.5*m2.*c2;
26	plot(t, S_usb);
27	title('Upper Sideband (USB) Signal');

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28 xlabel('Time (s)');
29 ylabel('Amplitude');
30 subplot(5,1,4);
31 S_lsb = 0.5*m1.*c2 + 0.5*m2.*c1;
32 plot(t, S_lsb);
33 title('Lower Sideband (LSB) Signal');
34 xlabel('Time (s)');
35 ylabel('Amplitude');
36 r=S_usb.*c1;
37 subplot(5,1,5)
38 [b a] = butter(1,0.0001);
39 mr=filter(b,a,r);
40 plot(t,mr);
41 title('Filtered Signal');
42 xlabel('Time (s)');
43 ylabel('Amplitude');
44 sgtitle('Sujal Singh (04119051723)')

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Output:

