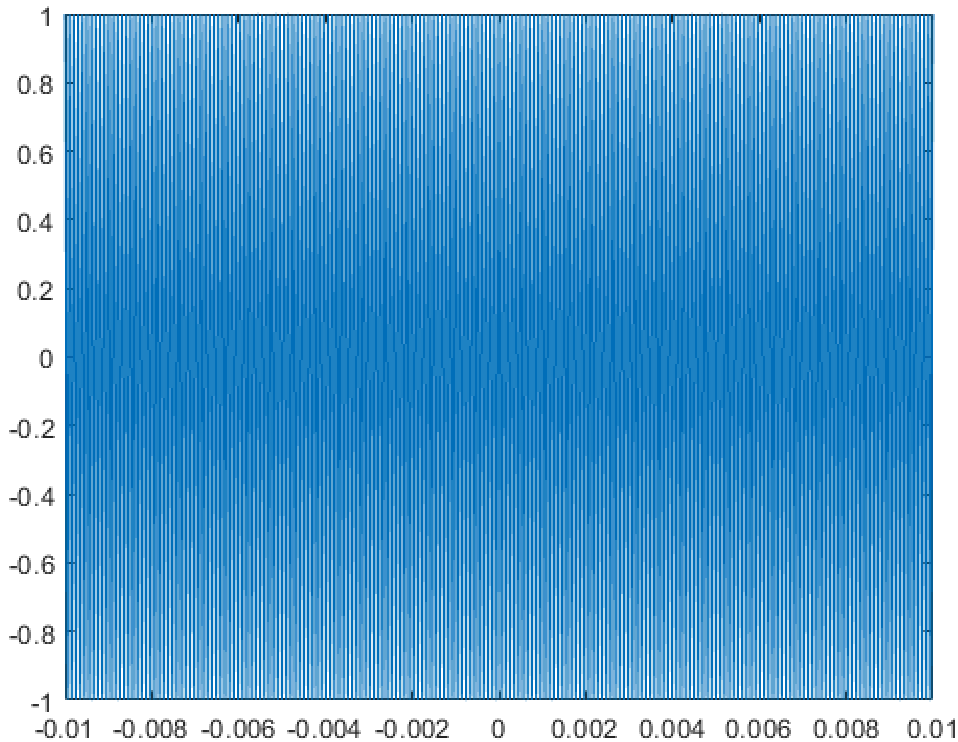
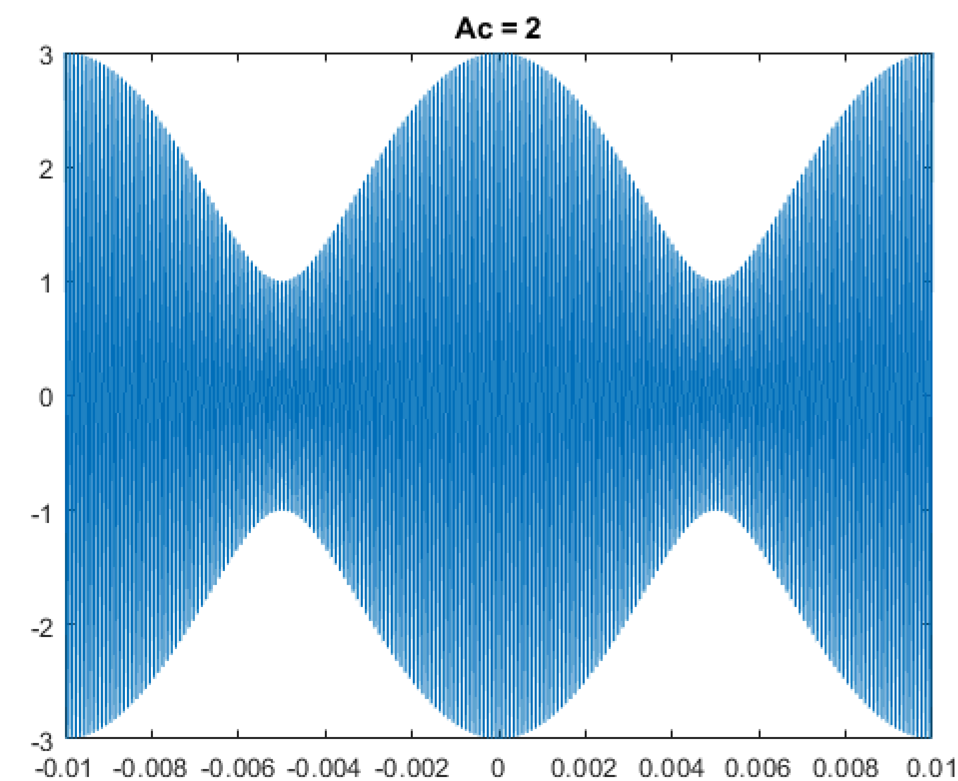
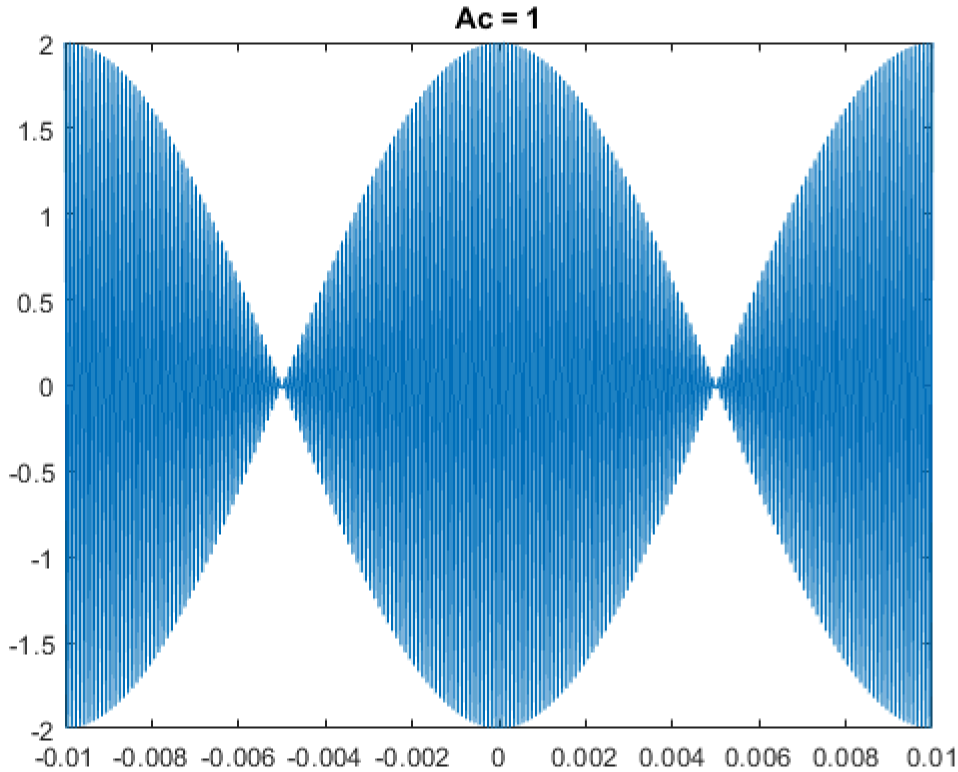
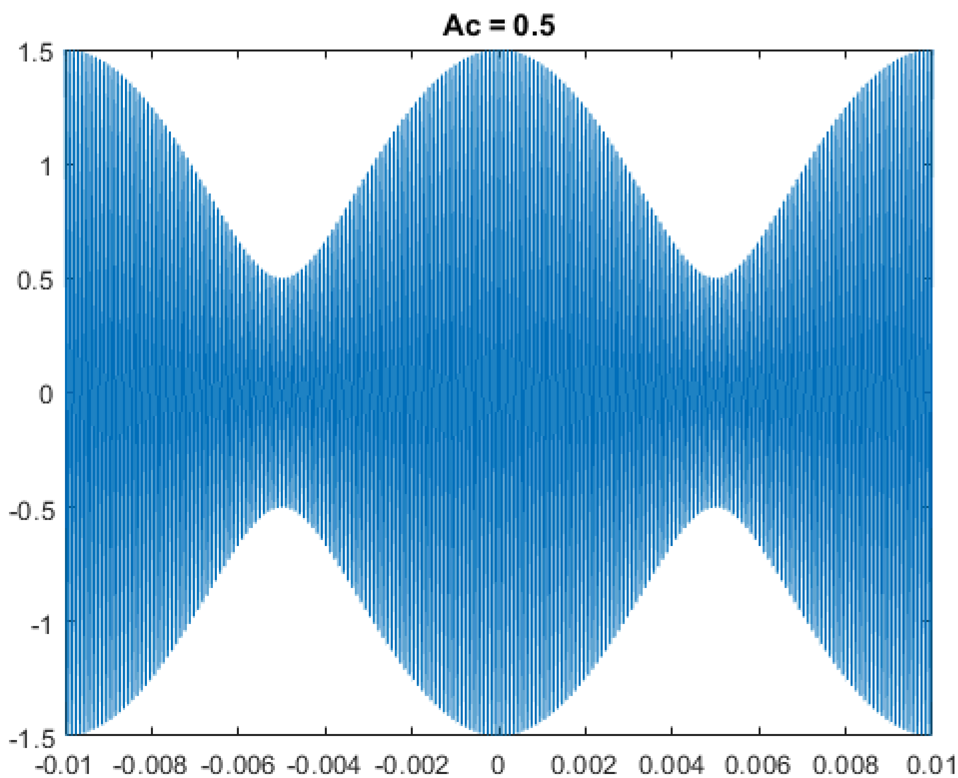
QUESTION - 2

```
clear;
close all;
clc;

fc = 10000;
fm = 100;
A = 1;
t = (-0.01:0.000001:+0.01);
a1 = cos(2*pi*fm*t).*cos(2*pi*fc*t);
a2 = sin(2*pi*fm*t).*sin(2*pi*fc*t);
Vlsb = a1+a2;

figure(1);
plot(t,Vlsb);


%part B
 % case_1
Ac = 2;  %amplitude of the carrier signal

a3 = cos(2*pi*fc*t);
VlsbAm  = Ac*a3 + A*Vlsb;
figure(2);
plot(t,VlsbAm);
title("Ac = 2");

% case_2
Ac = 1;
VlsbAm  = Ac*a3 + A*Vlsb;
figure(3);
plot(t,VlsbAm);
title("Ac = 1");

% case_3
Ac = 0.5;
VlsbAm  = Ac*a3 + A*Vlsb;
figure(4);
plot(t,VlsbAm);
title("Ac = 0.5");
```


1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
-0.01 -0.008 -0.006 -0.004 -0.002 0 0.002 0.004 0.006 0.008 0.01

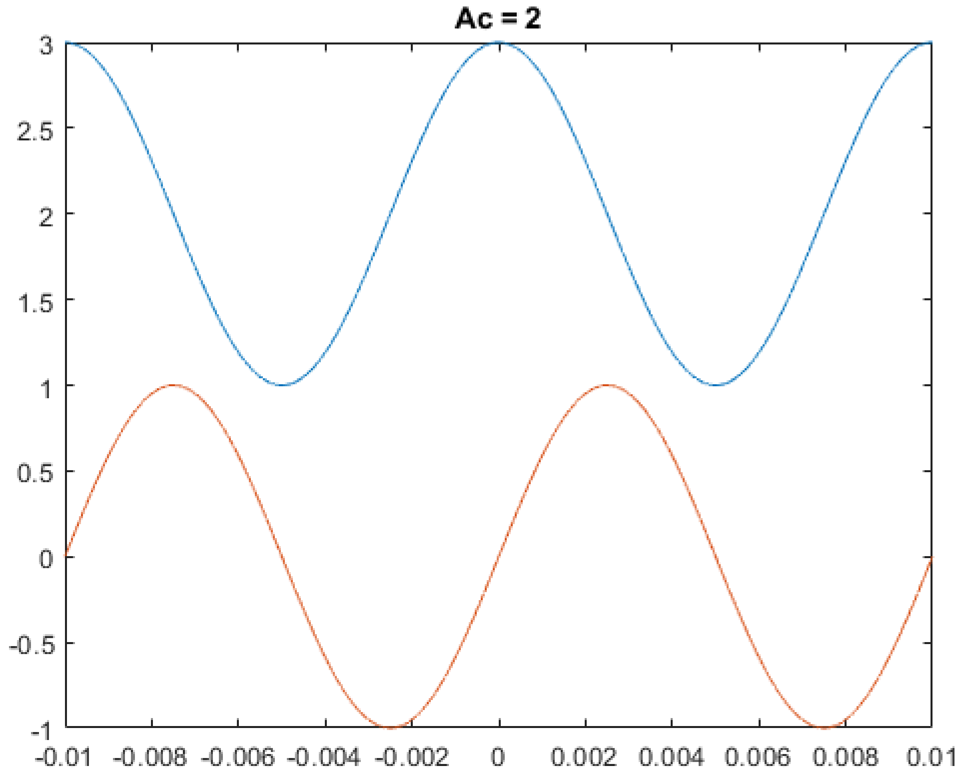

Ac = 2
3
2
1
0
-1
-2
-3
-0.01 -0.008 -0.006 -0.004 -0.002 0 0.002 0.004 0.006 0.008 0.01

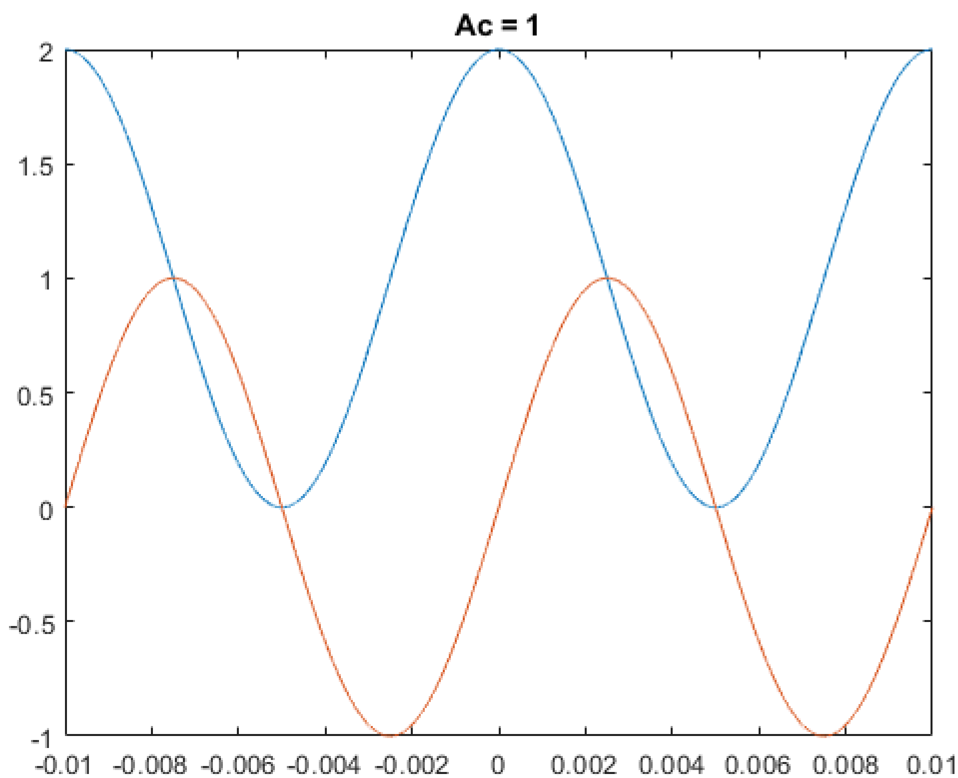

Ac = 1
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
-0.01
-0.008
-0.006
-0.004
-0.002
0
0.002
0.004
0.006
0.008
0.01


Ac = 0.5
1.5
1
0.5
0
-0.5
-1
-1.5
-0.01
-0.008
-0.006
-0.004
-0.002
0
0.002
0.004
0.006
0.008
0.01

part c

```
% Here mt= cos(2*pi*fm*t) so the hilbert transform of it will vary
%by 90 degree  and m^t= sin(2*pi*fm*t)

%provethe given equation, we can plot the graphs of RHS and LHS on
% same

t = (-0.01:0.000001:+0.01);       % time period
fm = 100;                          % message frequency
fc = 10000;                        % carrier frequency
Vlsb = cos(2*pi*(fc-fm)*t);        % single-sideband modulation wave
% here
% for Ac = 2
Ac=2;
figure(5);
plot(t,abs(Ac+cos(2*pi*fm*t)) , t,sin(2*pi*fm*t));
title("Ac = 2");

%for ac = 1
Ac=1;
figure(6);
plot(t,abs(Ac+cos(2*pi*fm*t)) , t,sin(2*pi*fm*t));
title("Ac = 1");

%{ from above plots for diffent value of ac follwing equation is verified

% |Ac + m(t)| > |m^(t)| is verified as we increase the value of ac

% as we can see at ac = 2 its not intersecting and will intersect at all
% othe value se it is verified at ac = 2
```


Ac = 2
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-0.01
-0.008
-0.006
-0.004
-0.002
0
0.002
0.004
0.006
0.008
0.01


Ac = 1
2
1.5
1
0.5
0
-0.5
-1
-0.01
-0.008
-0.006
-0.004
-0.002
0
0.002
0.004
0.006
0.008
0.01

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