SIGNALS AND SYSTEMS

PROJECT REPORT

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CERTIFICATE

This is to certify that the project work that is being submitted by AMOGH, PRAKHAR, SUJAY, YASH, AKASH, ASHISH for SIGNALS AND SYSTEMS is a record of bonafide work done under my supervision. The contents of this Project work, in full or in parts, have neither been taken from any other source nor have been submitted for any other CAL course.

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ACKNOWLEDGEMENT

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For question no.1. :-

1.Using MATLAB, study the changes in the spectrum of an x(t) due to a) Time-shift and scaling b) Amplitude scaling

MATLAB code :-

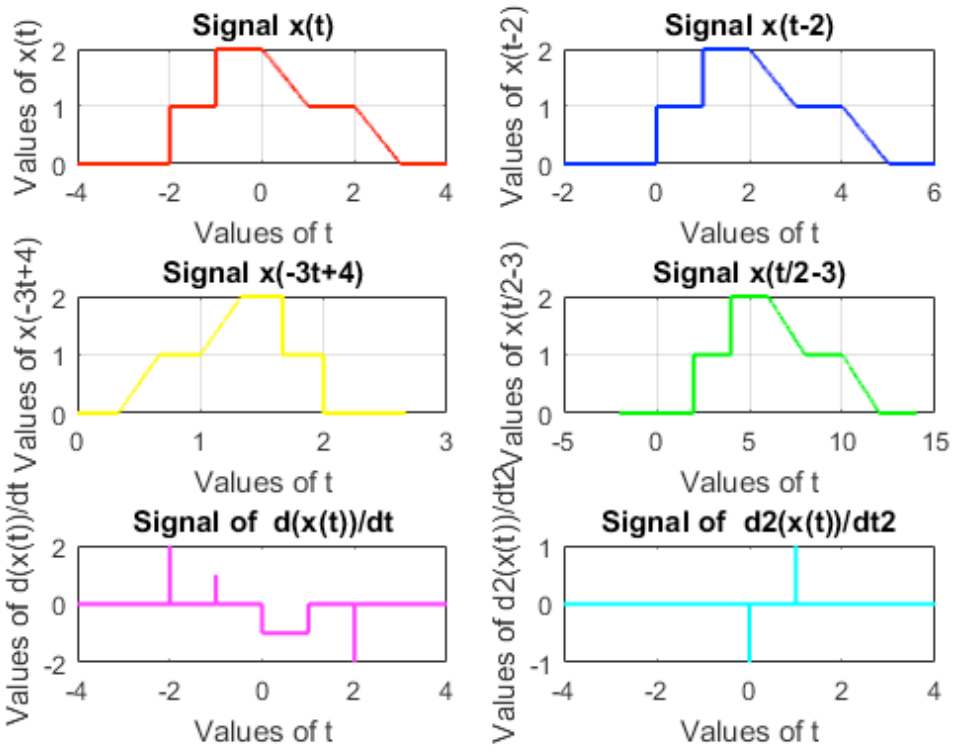
```
clc;

clear;

%time of signal
t=-4:0.001:4;
%signal x(t)
y=(t>=-2)+(t>=-1)-t.*(t>=0)+(t-1).*(t>=1)-(t-2).*(t>=2)+(t-3).*(t>=3);
subplot(3,2,1);
plot(t,y,'-r','LineWidth',1.5);
grid on
xlabel('Values of t');
ylabel('Values of x(t)');
title('Signal x(t)');
%for x(t-2)
k=t+2;
subplot(3,2,2);
plot(k,y,'-b','LineWidth',1.5);
grid on;
xlabel('Values of t');
ylabel('Values of x(t-2)');
title('Signal x(t-2)');
%for x(-3t+4)
m=-1.*t+4;
m1=1/3.*m;
subplot(3,2,3);
plot(m1,y,'-y','LineWidth',1.5);
grid on;
xlabel('Values of t');
ylabel('Values of x(-3t+4)');
title('Signal x(-3t+4)');
%for x(t/2-3)
m=t+3;
m1=2.*m;
subplot(3,2,4);
plot(m1,y,'-g','LineWidth',1.5);
grid on;
xlabel('Values of t');
ylabel('Values of x(t/2-3)');
```

```
title('Signal x(t/2-3)');
clc;
clear all;
t=-4:0.001:4;
%for x'(t)
x1=2.*gauspuls(t+2)+gauspuls(t+1)-1.*(t>=0)+(t>=1)-2.*gauspuls(t-2);
subplot(3,2,5);
plot(t,x1,'-m','LineWidth',1.5);
xlabel('Values of t');
ylabel('Values of d(x(t))/dt');
title('Signal of  d(x(t))/dt');
%for x"(t)
x2=-1.*gauspuls(t)+gauspuls(t-1);
subplot(3,2,6);
plot(t,x2,'-c','LineWidth',1.5);
xlabel('Values of t');
ylabel('Values of d2(x(t))/dt2');
title('Signal of  d2(x(t))/dt2');
```

OUTPUT :-

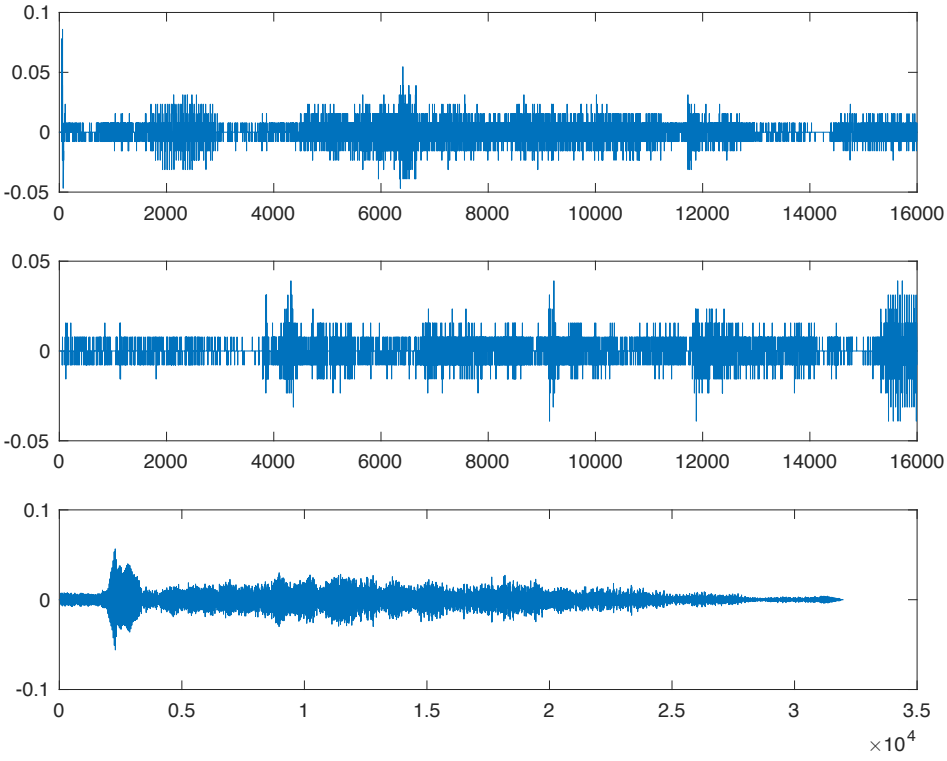


For question 6 :-

6. Find the similarity between two voice signals through correlation. Repeat the process for different signals and infer your observations. MATLAB CODE :-

```
clc
clear all
recObj=audiorecorder;
fin=input('Ready to embed voice');
disp('Start speaking.');
recordblocking(recObj,2);
disp('End of recording.');
play(recObj);
x = getaudiodata(recObj);
subplot(3,1,1);
plot(x);
fin=input('Ready to embed voice');
disp('Start speaking.');
recordblocking(recObj,2);
disp('End of recording.');
play(recObj);
y=getaudiodata(recObj);
subplot(3,1,2);
plot(y);
[a,b]=xcorr(x,y);
subplot(3,1,3);1
plot(a)
sound(a)
```

OUTPUT :-



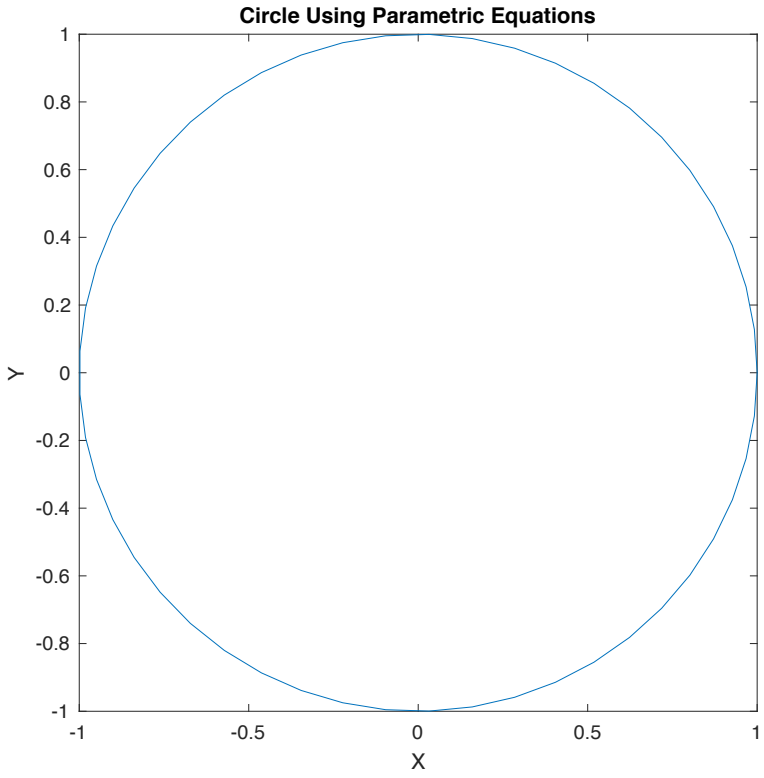
For question 15 :-
15.Plot a unit circle using sine and cosine functions.

MATLAB code :-

```
t = linspace(0, 2*pi, 50);
x = cos(t);
y = sin(t);

% Plot the result
figure(1)
plot(x,y);
xlabel('X');
ylabel('Y');
title('Circle Using Parametric Equations');
axis square;
```

OUTPUT:-



CONCLUSION

By executing the following codes, we get to understand the production of various types of signals and thus now have a greater understanding of doing operations on the so produced signals.