**Analog Modulation**

clc;

clear all;

close all;

am=10;

fm=10;

fc=100;

ac=10;

t=0:0.001:.1;

x=am\*sin(2\*pi\*fm\*t);

subplot(3,1,1);

plot(t,x);

xlabel('Time');

ylabel('Amplitude');

title('Message Signal / / 0');

y=ac\*sin(2\*pi\*fc\*t);

subplot(3,1,2);

plot(t,y);

xlabel('Time');

ylabel('Amplitude');

title('Carrier Signal / / 0');

b=10;

z= ac\*cos (2\*pi\*fc\*t + b\*sin(2\*pi\*fm\*t));

subplot(3,1,3);

plot(t,z);

xlabel('Time');

ylabel('Amplitude');

title('Analog Modulated Signal / / 0');

1. **Amplitude Modulation**
2. **Over modulation (am<ac)**

clc;

clear all;

close all;

am=10;

fm=10;

fc=100;

ac=5;

t=0:0.001:1;

x=am\*sin(2\*pi\*fm\*t);

subplot(3,1,1);

plot(t,x);

xlabel('Time');

ylabel('Amplitude');

title('Message Signal / / 0');

y=ac\*sin(2\*pi\*fc\*t);

subplot(3,1,2);

plot(t,y);

xlabel('Time');

ylabel('Amplitude');

title('Carrier Signal / / 0');

b=10;

z= ac\*cos (2\*pi\*fc\*t + b.\*sin(2\*pi\*fm\*t));

subplot(3,1,3);

plot(t,z);

xlabel('Time');

ylabel('Amplitude');

title('Over Modulated Signal / / 0');

1. **Under modulation (am>ac)**

clc;

clear all;

close all;

am=10;

fm=10;

fc=100;

ac=5;

t=0:0.001:1;

x=am\*sin(2\*pi\*fm\*t);

subplot(3,1,1);

plot(t,x);

xlabel('Time');

ylabel('Amplitude');

title('Message Signal / / 0');

y=ac\*sin(2\*pi\*fc\*t);

subplot(3,1,2);

plot(t,y);

xlabel('Time');

ylabel('Amplitude');

title('Carrier Signal / / 0');

b=10;

z= ac\*cos (2\*pi\*fc\*t + b.\*sin(2\*pi\*fm\*t));

subplot(3,1,3);

plot(t,z);

xlabel('Time');

ylabel('Amplitude');

title('Under Modulated Signal / / 0');

1. **100% modulation (am=ac)**

clc;

clear all;

close all;

am=5;

fm=10;

fc=100;

ac=5;

t=0:0.001:1;

x=am\*sin(2\*pi\*fm\*t);

subplot(3,1,1);

plot(t,x);

xlabel('Time');

ylabel('Amplitude');

title('Message Signal / / 0');

y=ac\*sin(2\*pi\*fc\*t);

subplot(3,1,2);

plot(t,y);

xlabel('Time');

ylabel('Amplitude');

title('Carrier Signal / / 0');

b=10;

z=ac\*cos(2\*pi\*fc\*t + b.\*sin(2\*pi\*fm\*t));

subplot(3,1,3);

plot(t,z);

xlabel('Time');

ylabel('Amplitude');

title(100% Modulated Signal / / 0');

1. **Frequency Modulation**

clc;

clear all;

close all;

am=10;

fm=10;

fc=100;

ac=10;

t=0:0.001:.1;

x=am\*sin(2\*pi\*fm\*t);

subplot(3,1,1);

plot(t,x);

xlabel('Time');

ylabel('Amplitude');

title('Message Signal / / 0');

y=ac\*sin(2\*pi\*fc\*t);

subplot(3,1,2);

plot(t,y);

xlabel('Time');

ylabel('Amplitude');

title('Carrier Signal / / 0');

b=10;

z= ac\*cos (2\*pi\*fc\*t + b\*sin(2\*pi\*fm\*t));

subplot(3,1,3);

plot(t,z);

xlabel('Time');

ylabel('Amplitude');

title(Frequency Modulated Signal / / 0');

1. **Phase Modulation**

clc;

clear all;

close all;

am=10;

fm=10;

fc=100;

ac=10;

t=0:0.001:.1;

x=am\*sin(2\*pi\*fm\*t);

subplot(3,1,1);

plot(t,x);

xlabel('Time');

ylabel('Amplitude');

title('Message Signal / / 0');

y=ac\*sin(2\*pi\*fc\*t);

subplot(3,1,2);

plot(t,y);

xlabel('Time');

ylabel('Amplitude');

title('Carrier Signal / / 0');

b=10;

z= ac\*cos (2\*pi\*fc\*t + b\*sin(2\*pi\*fm\*t));

subplot(3,1,3);

plot(t,z);

xlabel('Time');

ylabel('Amplitude');

title('Phase Modulated Signal / / 0');

**Ramp**

clc;

clear all;

close all;

i=1;

for t=-2:0.001:2;

if(t>=0);

x(i)=t;

else;

x(i)=0;

end;

i=i+1;

end;

t=-2:0.001:2;

subplot(2,1,1);

plot(t,x);

xlabel('time');

ylabel('amplitude');

title('Ramp//');

grid on;

i=1;

for t=-2:0.001:2;

if(t>=0);

x(i)=t;

else;

x(i)=0;

end;

i=i+1;

end;

t=-2:0.001:2;

subplot(2,1,2);

stem(t,x);

xlabel('time');

ylabel('amplitude');

title('Ramp//');

grid on;

**Sin Num**

clear all;

close all;

i=1;

for t=-2:0.001:2;

if(t>=0);

x(i)=1;

else;

    x(i)=-1;

end;

i=i+1;

end;

t=-2:0.001:2;

subplot(2,1,1);

plot(t,x);

xlabel('time');

ylabel('amplitude');

title('Sig num//');

grid on;

i=1;

for t=-2:0.001:2;

if(t>=0);

x(i)=1;

else if (t<0);

    x(i)=-1;

    else;

x(i)=0;

end;

end;

i=i+1;

end;

t=-2:0.001:2;

subplot(2,1,2);

stem(t,x);

xlabel('time');

ylabel('amplitude');

title('Sig num//');

grid on;

**Rectanngle**

clear all;

close all;

i=1;

for t=-2:0.001:2;

if(t>=0);

x(i)=1;

else;

    x(i)=-1;

end;

i=i+1;

end;

t=-2:0.001:2;

subplot(2,1,1);

plot(t,x);

xlabel('time');

ylabel('amplitude');

title('Rectangle //');

grid on;

i=1;

for t=-2:0.001:2;

if(t>=0);

x(i)=1;

else if (t<0);

    x(i)=-1;

    else;

x(i)=0;

end;

end;

i=i+1;

end;

t=-2:0.001:2;

subplot(2,1,2);

stem(t,x);

xlabel('time');

ylabel('amplitude');

title('Rectangle //');

grid on;

**Sinc**

clc;

clear all;

close all;

t=-10:0.001:10;

y=sin(t)./t;

subplot(2,1,1);

plot(t,y);

xlabel('time');

ylabel('amplitude');

title('Sinc //');

grid on;

subplot(2,1,2);

stem(t,y);

xlabel('time');

ylabel('amplitude');

title('Sinc //');

grid on;

**Square Wave**

clc;

clear all;

close all;

a=4;

f=10/0;

duty=50;

t=0:0.001:100;

sq\_wave=a\*square(2\*pi\*f\*t,duty);

plot(t,sq\_wave);

xlabel('time');

ylabel('amplitude');

title('Square wave//');

grid on;

**Unit Impulse**

clear all;

close all;

i=1;

for t=-2:0.001:2;

if(t==0);

x(i)=1;

else;

x(i)=0;

end;

i=i+1;

end;

t=-2:0.001:2;

subplot(2,1,1);

plot(t,x);

xlabel('time');

ylabel('amplitude');

title('Unit impulse//');

grid on;

i=1;

for t=-2:0.001:2;

if(t==0);

x(i)=1;

else;

x(i)=0;

end;

i=i+1;

end;

t=-2:0.001:2;

subplot(2,1,2);

stem(t,x);

xlabel('time');

ylabel('amplitude');

title('Unit impulse//');

grid on;

**Tittle: Base and Elementary Signal in Data Communication.**

**OBJECTIVE:**

To explore and generate various basic elementary Signals commonly used in data communication.

**THEORY**

Data communication system rely on various signal for transmitting and processing information. Understanding the properties and characteristics of the basic elementary signals is crucial for designing and analyzing such system.

Sine wave is a periodic waveform with a fundamental frequency and amplitude. Noise is a random signal with varying amplitude. DT (Discrete Time) and CT (Continuous Time) Signum function wave is a wave form defined by the sign of a periodic function. A continuous wave form derived from sine function is called Sin C wave. OT and DT unit impulse signals the the signals consisting of on impulse at a specific time. A period’s signal with alternative high and low levels are OT and DT square signal man while a linearly increasing or decreasing signal is CT/DT Ramp Signal

Sine wave are commonly used for modulation, oscillators and audio/video generation. Noise Signals are essential in testing system performance and for certain types of encryption. Signum" function wares find application in pulse shaping, signal detection, and pattern reorganization. Sine wave are used in interpolation, filter, design and communication systems. Unit impulse signal are fundamental in system response analysis and impulse response calculations. Square Signals the useful for clocking, digital circuit pulse width modulation and frequency analysis. Ramp signals find applications in time dependent system modeling and control systems.

**Tittle: Base and Elementary Signal in Data Communication.**

**OBJECTIVE:**

To explore and generate various basic elementary Signals commonly used in data communication.

**THEORY**





























