Name: Girish s **Roll: AM.EN.U4AIE22044**

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Lab Assignment - 1

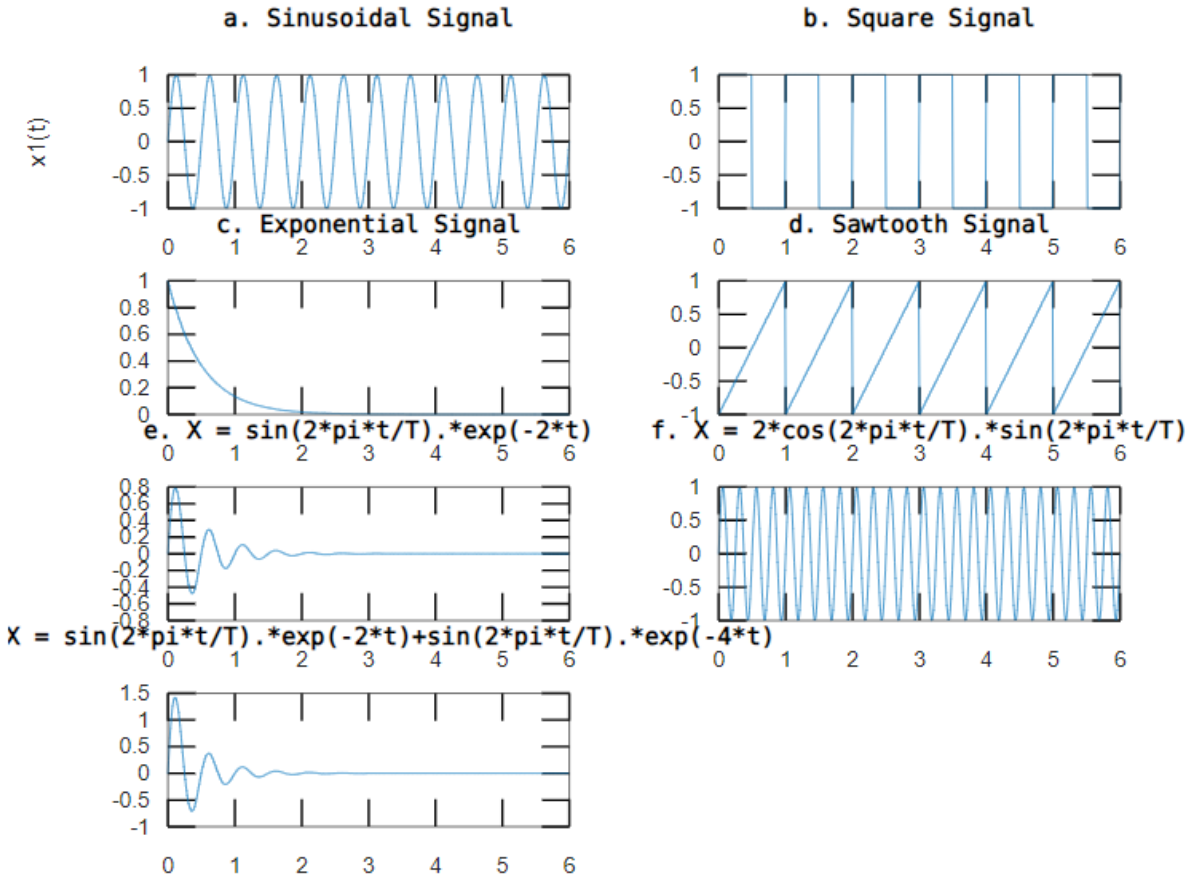
Signal Generation

Course Outcome: CO1: Familiarise the basic concepts of communication systems

1. Generate the following continuous time signals
   a. Sinusoidal signal
   b. Square signal
   c. Exponential signal
   d. sawtooth signal
   e. X1 = sin(2*pi*t/T).*exp(-2*t)
   f. X2 = 2*cos(2*pi*t/T2).*sin(2*pi*t/T3)
   g. X3= sin(2*pi*t/T).*exp(-2*t)+sin(2*pi*t/T1).*exp(-4*t)

```
clear all;
f = 2;
T = 1/f;
t = 0:0.01:6;

%Sinusoidal signal
x1 = sin(2*pi*f*t);
subplot (4,2,1) ;
plot (t,x1);
title ('a. Sinusoidal Signal');
ylabel("x1(t) "), xlabel ("t");

%Square signal
x2=square(2*pi*t);

subplot(4,2,2) ;
plot(t,x2);
title('b. Square Signal');

%exponential signal
x3=exp(-2*t);
subplot(4,2, 3) ;
plot(t, x3) ;
title('c. Exponential Signal');

%Sawtooth signal
x4=sawtooth(2*pi*t);
subplot(4, 2, 4) ;
plot(t, x4);
title("d. Sawtooth Signal");


%  X1 = sin(2*pi*t/T).*exp(-2*t)

x5 = sin(2*pi*t/T).*exp(-2*t);
subplot(4, 2, 5)
plot(t, x5);
```

```
title("e. X = sin(2*pi*t/T).*exp(-2*t)");

x6 = 2*cos(2*pi*t/T).*sin(2*pi*t/T);
subplot(4, 2, 6);
plot(t, x6);
title("f. X = 2*cos(2*pi*t/T).*sin(2*pi*t/T)")

x7 = sin(2*pi*t/T).*exp(-2*t)+sin(2*pi*t/T).*exp(-4*t);
subplot(4, 2, 7);
plot(t, x7);
title("g. X = sin(2*pi*t/T).*exp(-2*t)+sin(2*pi*t/T).*exp(-4*t)")
```



2. Plot discrete time periodic signals of given amplitude and frequency
   a. Sine wave
   b. Square wave
   c. Triangular wave

```
% Parameters
amplitude = 10;
frequency = 5;
t = 0:0.01:5/frequency;


% Sine wave
sine_wave = amplitude*sin(2 * pi * frequency * t);

% Square wave
square_wave = amplitude*square(2 * pi * frequency * t);
```

```
% Triangular wave
triangular_wave = amplitude*sawtooth(2 * pi * frequency * t, 0.5);


subplot(3,1,1);
plot(t, sine_wave);
title('a. Sine Wave');
xlabel('Time');
ylabel('Amplitude');

subplot(3,1,2);
plot(t, square_wave);
title('b. Square Wave');
xlabel('Time');
ylabel('Amplitude');

subplot(3,1,3);
plot(t, triangular_wave);
title('c. Triangular Wave');
xlabel('Time');
ylabel('Amplitude');
```