Lab 01 : To generate Discrete Time Signal

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Name : Pawan Dilip Sorte Roll Number : 63 Batch : B4

Impulse Signal

```
n0 = 0;
n1 = -10;
n2 = 10;
[x,n]= impulseSeq(n0, n1, n2);
figure(1)
stem(n,x);
axis([min(n)-1, max(n)+1, min(x)-0.2, max(x)+0.2])
title('impulse signal')
xlabel('samples')
ylabel('\delta[n]')
% function [x,n] = impulseSeq(n0, n1, n2)
%
% if n0<n1 || n0>n2
%     error('The Value of reference point is wrong')
% end
%
% n = n1:n2;
% x = (n == n0);
% end
```

Unit Step Signal

```
n0 = 0;
n1 = -10;
n2 = 10;
[x,n]= UnitStepSeq(n0, n1, n2);
figure(2)
stem(n,x);
axis([min(n)-1, max(n)+1, min(x)-0.2, max(x)+0.2])
```

```matlab
title('Unit Step Signal')
xlabel('samples')
ylabel('u(n)')
% function [x,n] = UnitStepSeq(n0, n1, n2)
% if n0<n1 || n0>n2
%     error('The Value of reference is wrong')
% end
% n = n1:n2
% x = (n >= n0)
% end
```

Exercise - 1

```matlab
[x1,n]= impulseSeq(2, n1, n2);
[x2,n]= impulseSeq(-2, n1, n2);
[x3,n]= UnitStepSeq(3, n1, n2);
[x4,n]= UnitStepSeq(-3, n1, n2);
figure(3)
subplot(2,2,1)
stem(n,x1)
title('\delta[n-2]')
subplot(2,2,2)
stem(n,x2)
title('\delta[n+2]')
subplot(2,2,3)
stem(n,x3)
title('\delta[n-3]')
subplot(2,2,4)
stem(n,x4)
title('\delta[n+3]')
```

Real Value Exponential Signal

```matlab
n = 0:20;
x5 = 0.9.^n;
x6 = (-0.9).^n;
figure(4)
subplot(2,1,1)
stem(n,x5)
title('Real Valuse Exponential for a=0.9')
subplot(2,1,2)
stem(n,x6)
title('Real Valuse Exponential for a=-0.9')
```

Home Assignment - 1

```matlab
n1 = -15;
n2 = 15;
[x7,n] = impulseSeq(4, n1, n2);
figure(5)
subplot(2,2,1)
stem(n,4*x7);
```

```matlab
title('4\delta[n-4]')
[x8,n] = impulseSeq(-3, n1, n2);
figure(5)
subplot(2,2,2)
stem(n,-3*x8);
title('-3\delta[n+3]')
n0=2
[x9,n]= UnitStepSeq(2, n1, n2);
figure(5)
subplot(2,2,3)
stem(n,2.5*x9);
title('2.5u[n-2]')
[x10,n]= UnitStepSeq(-4, n1, n2);
figure(5)
subplot(2,2,4)
stem(n,4*x10);
title('4u[n+4]')

[x11 = 4*x7-3*x8+5*x9+4*x10]
figure(6)
stem(n,x11)
```

Sine Signal

```matlab
F = 100;
t = 0:0.01*1/F:2/F;
x = 2*sin(2*pi*F*t)
figure(7)
subplot(2,1,1)
plot(t,x)
xlabel('Time')
ylabel('Amplitude')
title('Sine signal in Ct')
subplot(2,1,2)
stem(t,x)
xlabel('Time')
ylabel('Amplitude')
title('Sine signal in Dt')
```

Cosine Signal

```matlab
F = 300;
t = 0:0.003*1/F:2/F;
x = 2*cos(2*pi*F*t)
figure(8)
subplot(2,1,1)
plot(t,x)
xlabel('Time')
ylabel('2*cos(2*pi*F*t)')
title('Cosine Signal in CT')
subplot(2,1,2)
stem(t,x)
xlabel('Time')
```

```matlab
ylabel('2*cos(2*pi*F*t)')
title('Cosine Signal in DT')
```

Square Waveform

```matlab
F = 100; % Frequency of Square Wave
t = 0:0.01/F:4/F;
x = 5*square(2*pi*F*t,50)
figure(9)
plot(t,x)
axis([min(t)-0.001, max(t)+0.001, min(x)-0.2, max(x)+0.2])
xlabel('Time')
ylabel('square(2*pi*F*t,50)')
title('Square Signal')
```

Sawtooth Waveform

```matlab
F = 100;
t = 0:0.01/F:4/F;
x = 5*sawtooth(2*pi*F*t);
figure(10)
plot(t,x)
axis([min(t)-0.001, max(t)+0.001, min(x)-0.5, max(x)+0.5])
xlabel('Time')
ylabel('5*sawtooth(2*pi*F*t)')
title('Sawtooth Signal')
```

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