Exp. No.2. Implementation of Sampling Theorem.

# Sampling Theorem:

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**MATLAB code:**

clc;

close all;

clear all;

%% Continous signal Generation

t=-10:0.01:10;

T=4;

fm=1/T;

x=cos(2\*pi\*fm\*t);

subplot(3,3,1);

plot(t,x);

grid on;

xlabel('Time in Seconds');

ylabel('Ampltude');

fs1=1.6\*fm;

fs2=2\*fm;

fs3=8\*fm;

fs4=10\*fm;

fs5=12\*fm;

fs6=16\*fm;

%%Samplng Freq not less than 2Fm

n1=-4:1:4;

xn1=cos(2\*pi\*fm\*n1/fs1);

subplot(3,3,2);

stem(n1,xn1);

hold on;

subplot(3,3,2);

plot(n1,xn1);

grid on;

xlabel('n1');

ylabel('Discrete signal for fs<2fm');

title('Discrete signal');

%%Samplng Freq equal to 2fm

n2=-5:1:5;

xn2=cos(2\*pi\*fm\*n2/fs2);

subplot(3,3,3);

stem(n2,xn2);

hold on;

subplot(3,3,3);

plot(n2,xn2);

xlabel('n2');

ylabel('Discrete signal for fs=2fm');

title('Discrete signal');

grid on;

%%Samplng Freq greater than 2fm

n3=-20:1:20;

xn3=cos(2\*pi\*fm\*n3/fs3);

subplot(3,3,4);

stem(n3,xn3);

hold on;

subplot(3,3,4);

plot(n3,xn3);

xlabel('n3');

ylabel('Discrete signal for fs>2fm');

title('Discrete signal');

grid on;

%% SAMPLING FREQUNECY fs=10fm

n4=-40:1:40;

xn4=cos(2\*pi\*fm\*n4/fs4);

subplot(3,3,5);

stem(n4,xn4);

hold on;

subplot(3,3,5);

plot(n4,xn4);

xlabel('n4');

ylabel('Discrete signal for fs>10fm');

title('Discrete signal');

grid on;

%% SAMPLING FREQUNECY fs=12fm

n5=-80:1:80;

xn5=cos(2\*pi\*fm\*n5/fs5);

subplot(3,3,6);

stem(n5,xn5);

hold on;

subplot(3,3,6);

plot(n5,xn5);

xlabel('n5');

ylabel('Discrete signal for fs>12fm');

title('Discrete signal');

grid on;

%% SAMPLING FREQUNECY fs=16fm

n6=-100:1:100;

xn6=cos(2\*pi\*fm\*n6/fs6);

subplot(3,3,7);

stem(n6,xn6);

hold on;

subplot(3,3,7);

plot(n6,xn6);

xlabel('n6');

ylabel('Discrete signal for fs>16fm');

title('Discrete signal');

grid on;

Output Graph:

