**LAB#2**

**OBJECT:** Effects of sampling on analog signal.

**Task1:**

Write a script to generate a continous time signal with a=2. Take frequency as user input.

**Coding:**

a=2

f=input('Analog Frequency : ')

t=0.1:1/100:1

x=a\*sin(2\*pi\*f\*t)

plot(t,x)

**Result:**

Analog Frequency : 2

f = 2

**Figure:**



**Task2:**

Write a script to convert continous time to discrete time signal & take the signal frequency should be equal to twice of signal frequency.

**CODING:**

a=2

fa=input('Analog Frequency : ')

fs=2\*fa

t=0:1/fs:2/fa

x=a\*cos(2\*pi\*fa\*t)

stem(t,x)

Result:

Analog Frequency : 50

fa = 50

fs = 100

**FIGURE:**



**TASK3:**

Write a script to convert continous time to discrete time signal & take the signal frequency should be greater than of signal frequency.

**CODING:**

a=2

fa=input('Analog Frequency : ')

fs=20\*fa

t=0:1/fs:1/fa

x=a\*cos(2\*pi\*fa\*t)

stem(t,x)

**Result:**

fa = 50

fs = 1000

**FIGURE:**



**TASK4:**

Write a script to convert continous time to discrete time signal & take the signal frequency should be greater than of signal frequency.

**CODING:**

a=2

fa=input('Analog Frequency : ')

fs=fa

t=0:1/fs:2/fa

x=a\*cos(2\*pi\*fa\*t)

stem(t,x)

**RESULT:**

Analog Frequency : 50

fa = 50

fs = 50

**FIGURE:**



**TASK5:**

Subplot the result of task 2,3 &4 $ analyze three parts.

**CODING:**

a=2

fa=input('Analog Frequency : ')

fs=2\*fa

t=0:1/fs:2/fa

x=a\*cos(2\*pi\*fa\*t)

subplot(3,1,1)

stem(t,x)

fs=20\*fa

t=0:1/fs:1/fa

x=a\*cos(2\*pi\*fa\*t)

subplot(3,1,2)

stem(t,x)

fs=fa

t=0:1/fs:2/fa

x=a\*cos(2\*pi\*fa\*t)

subplot(3,1,3)

stem(t,x)

**FIGURE:**



**TASK6:**

Consider the analog signal x(t)=3cos(100\*pi\*f\*t)

1. Determine the minimum sampling rate required to avoid aliasing.
2. Suppose that the signal is sampled of rate fs=200. What is discrete time signal obtained after sampling .plot discrete signal.
3. Suppose that the signal is sampled of rate fs=75. What is discrete time signal obtained after sampling .plot discrete signal

**CODING:**

1. Determine the minimum sampling rate required to avoid aliasing.

**ANSWER:**

Minimmum sampling rate =0:1/100:50

Fs=100Hz

1. Suppose that the signal is sampled of rate fs=200. What is discrete time signal obtained after sampling .plot discrete signal.

**CODING:**

a=3

fa=50

fs=200

t=0:1/fs:2/fa

x=a\*cos(100\*pi\*t)

stem(t,x)

**FIGURE:**



1. Suppose that the signal is sampled of rate fs=75. What is discrete time signal obtained after sampling plot discrete signal.

**CODING:**

a=3

fa=50

fs=75

t=0:1/fs:2/fa

x=a\*cos(100\*pi\*t)

stem(t,x)

**FIGURE:**

