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Course Name: Data Communication

Section: D

Lab Report Number: 02

Semester: 2021-2022 Fall

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Lab Performance Task

ID = AB-CDEFG-H

Here, my id is: 20-42195-1

A = 2, B = 0, C = 4, D = 2, E = 1, F = 9, G = 5, H = 1

Generate a composite signal using three simple signals:

x1 = a1*cos(2*pi*f1*t), x2 = a2*sin(2*pi*f2*t), x3 = a3*cos(2*pi*f3*t)

signal x = x1 + x2 + x3

a1 = A + C + 1 = 2 + 4 + 1 = 7

a2 = A + D + 2 = 2 + 2 + 2 = 6

a3 = A + E + 1 = 2 + 1 + 1 = 4

f1 = A + E + 1 = 2 + 1 + 1`= 4

f2 = A + D + 2 = 2 + 2 + 2 = 6

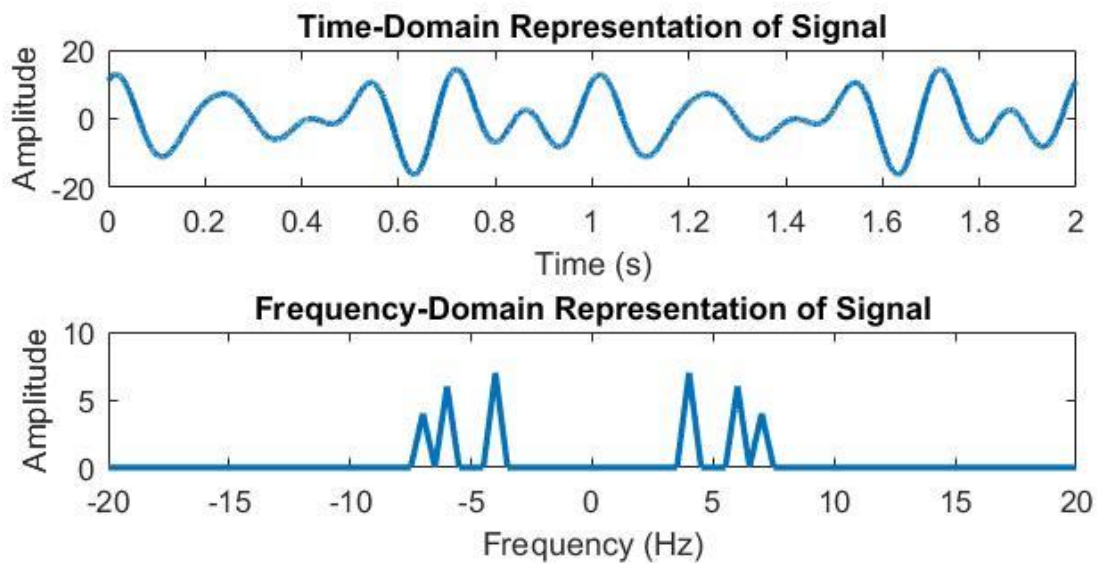f3 = A + C + 1 = 2 + 4 + 1 = 7

a)Code:

```
close all;
clc;
fs = 8000;
a1 = 7;
a2 = 6;
a3 = 4;
f1 = 4;
f2 = 6;
f3 = 7;
t = 0:1/fs:2;
x1 = a1*cos(2*pi*f1*t);
x2 = a2*sin(2*pi*f2*t);
x3 = a3*cos(2*pi*f3*t);
nx = length(t);
signal_x = x1 + x2 + x3;
subplot(3,1,1);
plot(t, signal_x,'linewidth',2);
```

```matlab
title('Time-Domain Representation of Signal');
xlabel('Time (s)');
ylabel('Amplitude');
fftSignal = fft(signal_x);
fftSignal = fftshift(fftSignal)/(nx/2);
f = linspace(-fs/2,fs/2,nx);
subplot(3,1,2);
plot(f, abs(fftSignal),'linewidth',2);
title('Frequency-Domain Representation of Signal');
xlabel('Frequency (Hz)');
ylabel('Amplitude');
xlim([-20 20])
```

b)Code:

```matlab
close all;
clc;
fs = 10000;
a1 = 7;
a2 = 6;
a3 = 4;
f1 = 4;
f2 = 6;
f3 = 7;
t = [-0.14:1/fs:0.14];
x1 = a1*cos(2*pi*f1*t);
x2 = a2*sin(2*pi*f2*t);
x3 = a3*cos(2*pi*f3*t);
nx = length(t);
signal_x = x1 + x2 + x3;
partition = -3.5:3.5;
codebook = -4:4;
[index,quants] = quantiz(signal_x,partition,codebook);
figure
plot(t,signal_x,'x',t,quants,'.');
legend('Original signal','Quantized signal');
```