



T.C YEDİTEPE UNIVERSITY

EE 361 – Introduction to Digital Signal Processing

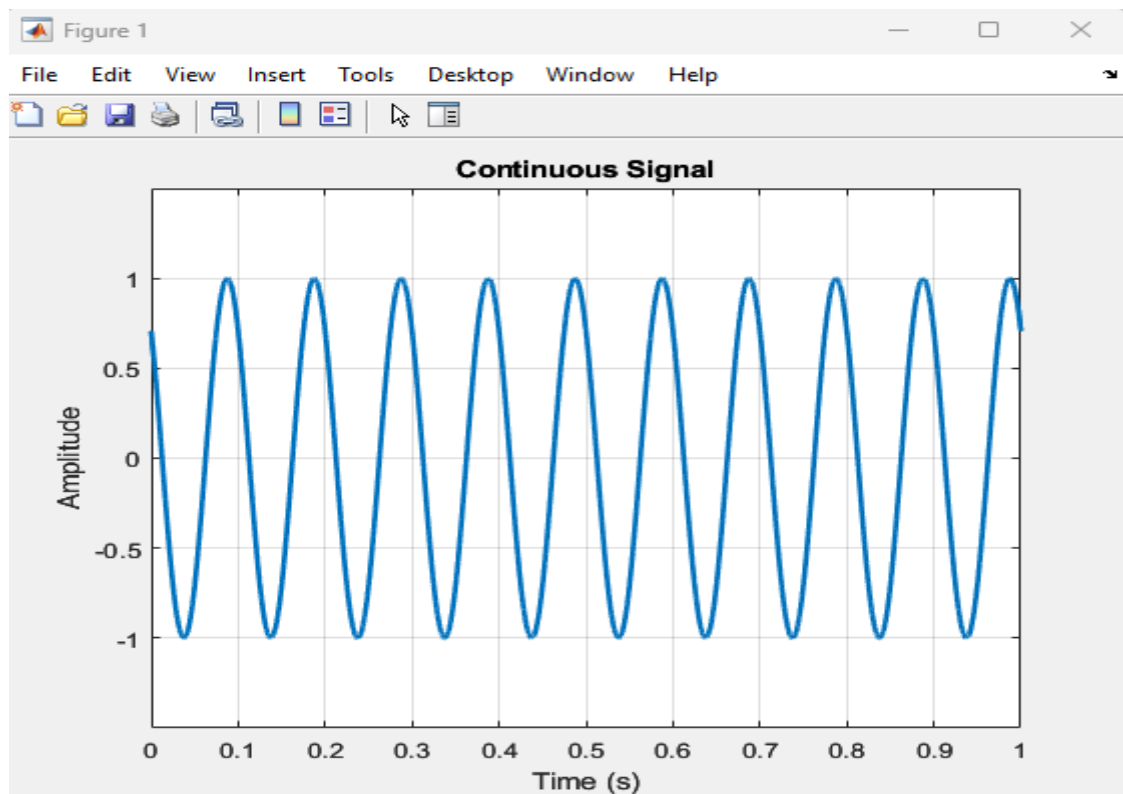
Experiment 3: Sampling and Aliasing

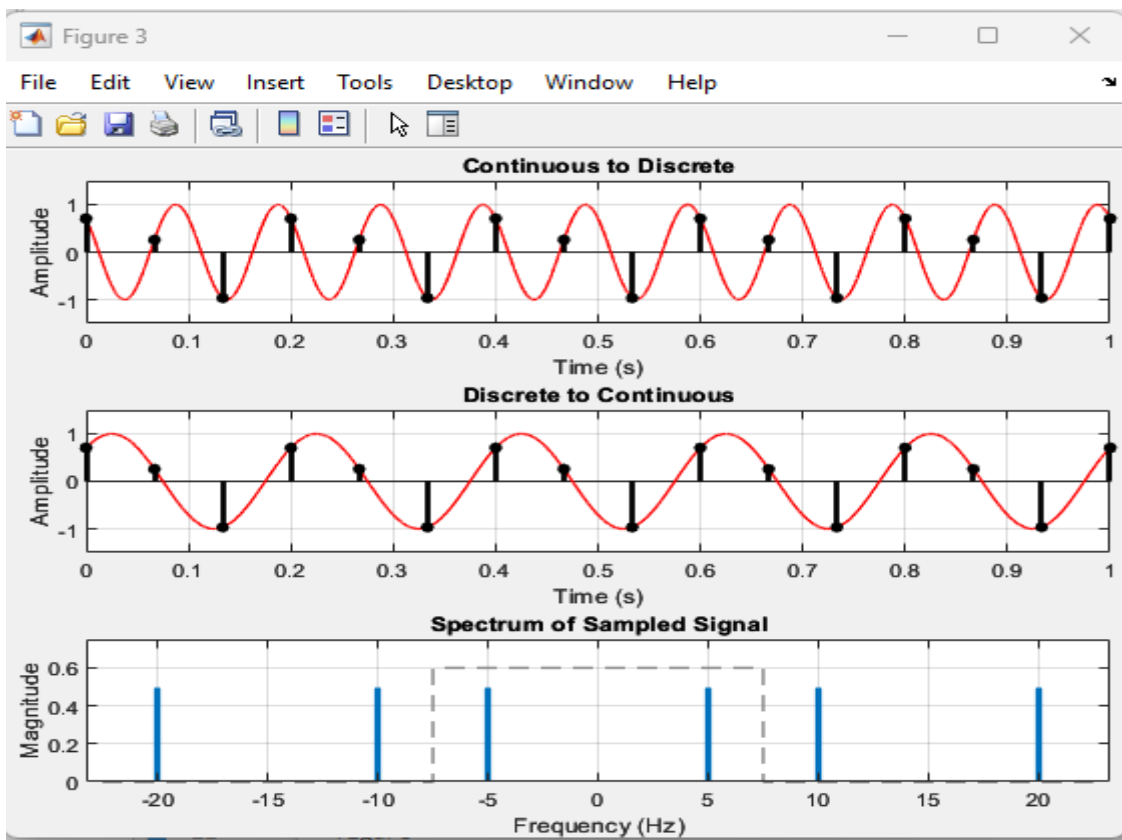
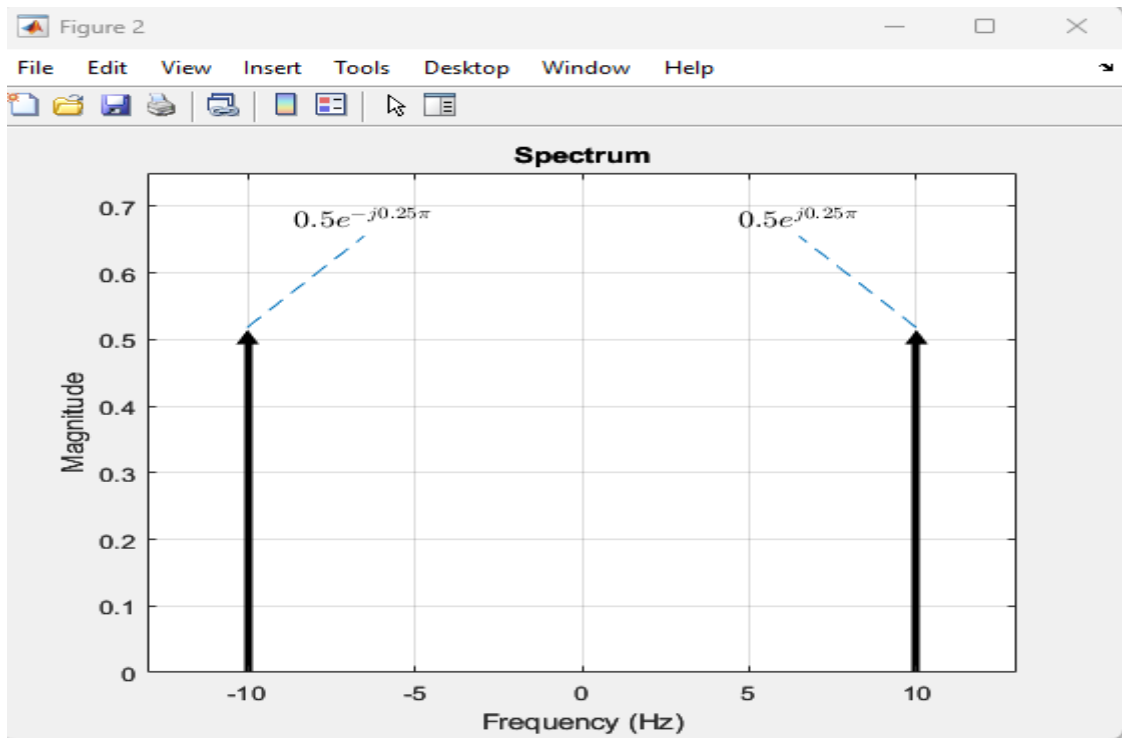
DOĞUKAN KÖSEOĞLU

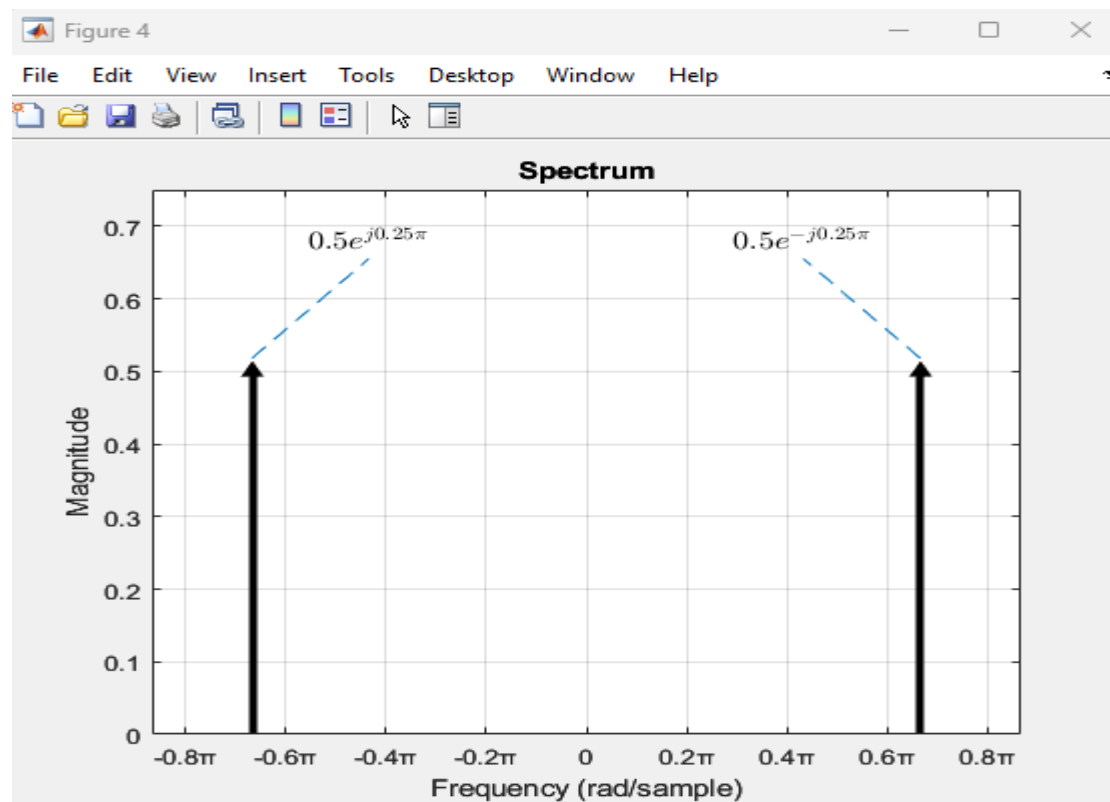
```

1  clc;
2  clear variable;
3  close all;
4
5  % Defining the signal and the sampling rate
6  f = 10 ;
7  fs = 15 ;
8  t = 0:1/(fs*1e+3 ):10/f ;
9  s = cos (2*pi*f*t + pi/4);
10 % plotting the signal
11 plot (t,s,'LineWidth',2)
12 ylim([-1.5*max(abs(s)),1.5*max(abs(s))])
13 xlim ([0,10/f])
14 title ('Continuous Signal')
15 xlabel ('Time (s)')
16 ylabel ('Amplitude')
17 grid
18 %Plotting the spectrum of the continuous signal
19 sc1 = [f,0.5*exp(1i*(pi/4))]; % spectral components of
20 sc2 = [-f,0.5*exp(1i*(-pi/4))]; % the continuous signal
21 figure
22 spec('c' ,sc1,sc2)
23 %sampling and resynthesizing
24 figure
25 idcon (s,t,fs);
26 % Plotting the spectrum of the sampled signal
27 sc3 = [2*pi/3,0.5*exp(1i*(-pi/4))] ; % spectral components of
28 sc4 = [-2*pi/3,0.5*exp(1i*(pi/4))] ; % the discrete signal
29 figure
30 spec('d',sc3,sc4);
31

```







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32 %%
33
34 f1 = 13;
35 f2 = 3 ;
36 t = 0:1/16e+3:10/f1;
37 s = 8*cos(2*pi*f1*t + pi/2) + 2*cos(2*pi*f2*t - pi/3);
38 spec('c', [13,4*exp(1i*(pi/2))],[-13,4*exp(1i*(-pi/2))],[3,1*exp(1i*(-pi/3))],[-3,1*exp(1i*(pi/3))])
39 figure
40 plot(t,s)
41 figure
42 idcon(s,t,16)
43 figure
44 spec('d',[3*2*pi/16,1*exp(1i*(-pi/3)) + 4*exp(1i*(-pi/2))],[-3*2*pi/16,1*exp(1i*(pi/3))+4*exp(1i*(pi/2))])
45
46

```

