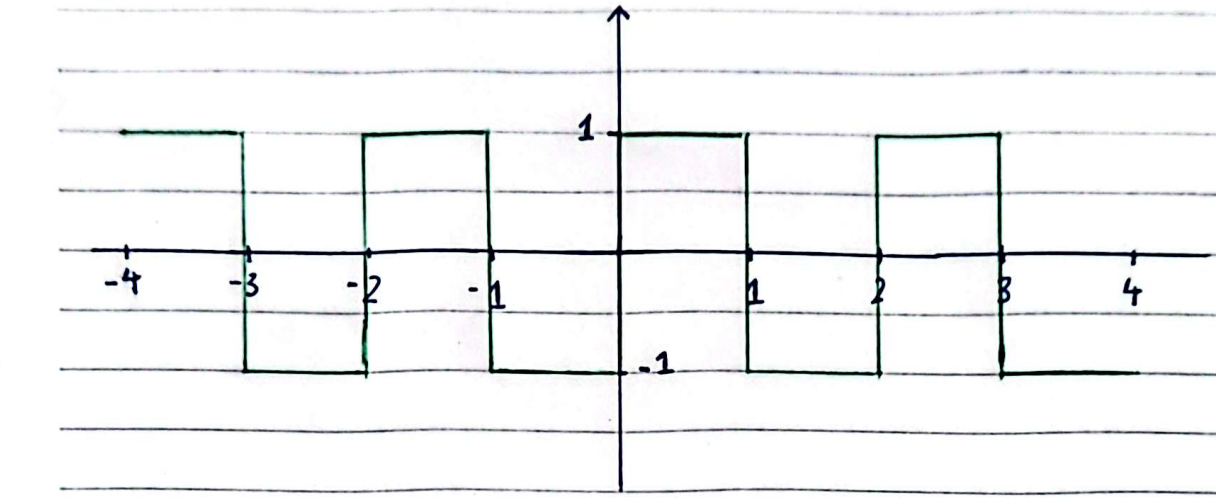
Handi Awad
21-10-11

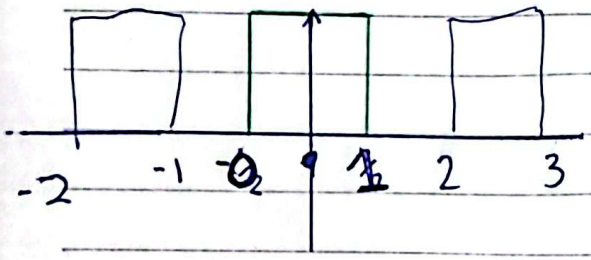
Assignment 6

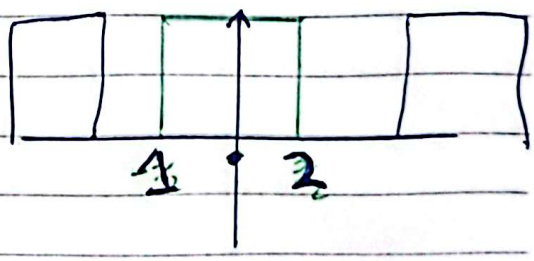
Problem 1:



C_K → Top part of Signal

d_K → Bottom part of Signal





Shift by 1.5 to left

Shift by 3/2 to left

$T_1 = 1/2 \qquad T = 2 \qquad w_0 = \frac{2\pi}{2} = \pi$

General form

$$a_k \begin{cases} 2T_1/T & ; \ k=0 \\ \dfrac{2\sin(k\omega_0 T_1)}{k\omega_0 T} & ; \ k\neq 0 \end{cases}$$

So

$$C_k \begin{cases} 2*0.5/2 & ; \ k=0 \\ \dfrac{2\sin(k*\pi*0.5)}{k*\pi*2} & ; \ k\neq 0 \end{cases} \cdot e^{(-jk\pi\cdot\frac{1}{2})}$$

~~$C_k = a_k \cdot e$~~

$$d_k \begin{cases} \dfrac{2*0.5}{2} & ; \ k=0 \\ \dfrac{2\sin(k*\pi*0.5)}{k*\pi*2} & ; \ k\neq 0 \end{cases} \cdot e^{-jk\pi\cdot\frac{3}{2}*(-1)}$$

$$a_k = C_k + d_k \quad \cdot e^{-jk\pi\cdot\frac{1}{2}} \quad \cdot e^{-jk\pi\cdot\frac{3}{2}(*1)}$$

$$a_k \begin{cases} \dfrac{2*0.5}{2} + \dfrac{2*0.5}{2} & ; \ k=0 \\ \dfrac{2\sin(k\pi*0.5)}{k\pi*2}\left(e^{-jk\pi\frac{1}{2}} + e^{-jk\pi\frac{3}{2}(*-\ldots} \right. & ; \ k\neq 0 \end{cases}$$

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- q1.m
- q2.m

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q1.m | q2.m

```
30  Num_1
31
32  % Det
33  a0_10
34  an_10
35  bn_10
36
37  for n
38      a
39      b
40  end
41
42  % Sum
43  recon
44  for n
45      r
46  end
47
48  % Plo
49  figur
50
51  % Ori
52  subpl
53  plot(
54  title
55  xlabe
56  ylabe
57
58
```

...ith size 1 x 100

...i*n/T * t) + bn_100(n) * sin(2*pi*

Figure 1

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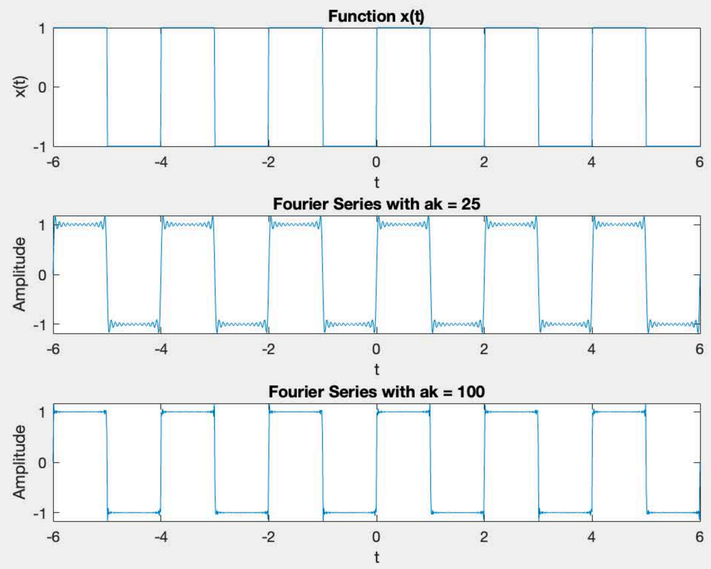

Command Window

New to MATLAB? See resources for Getting Started.

```
For product information, visit www.mathworks.com.

>> q1
>> q1
>> q1
>> q1
>> q1
>> q2
>> q1
>> q1
fx >>
```

Workspace

Name	Value
a0_100	-2.4286e-17
a0_25	-2.4286e-17
an_100	1x100 double
an_25	1x25 double
bn_100	1x100 double
bn_25	1x25 double
f1	100
f2	50
fs	1000
n	100
N_100	75
N_25	25
Num_100	100
Num_25	25
reconstructed_...	1x1000 double
reconstructed_...	1x1000 double
t	1x1000 double
T	2
X_f	1x1000 double
x_t	@(t)sign(sin(pi*t))

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Name
- Assignment 6 S&S Hamdi Awad 21-101011.pdf
- q1.m
- q2.m

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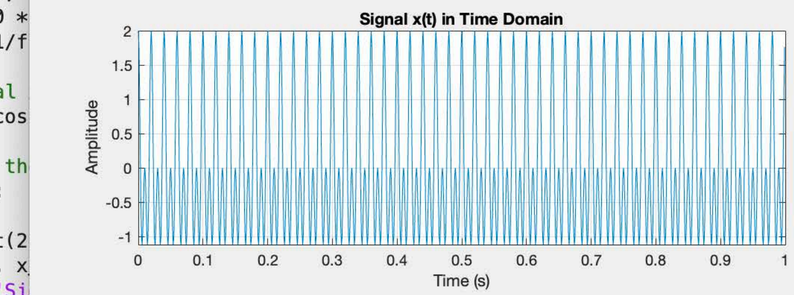
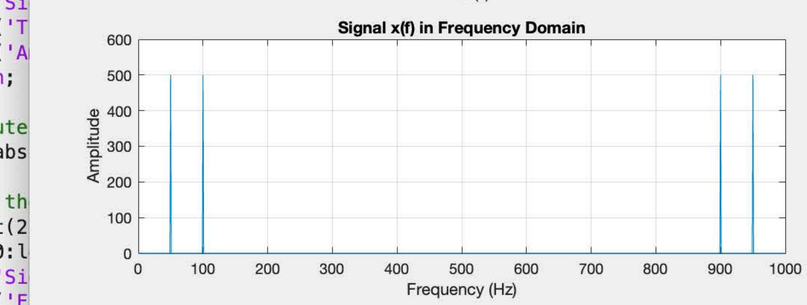
q1.m q2.m

```
% Define
f1 = 100;
f2 = 50;
fs = 10 *
t = 0:1/f

% signal
x_t = cos

% Plot th
figure;

subplot(2
plot(t, x
title('Si
xlabel('T
ylabel('A
grid on;

% Compute
X_f = abs

% Plot th
subplot(2
plot((0:l
title('Si
xlabel('F
ylabel('Amplitude');
grid on;
```

Figure 1

File Edit View Insert Tools Desktop Window Help





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```
>> q1
>> q1
>> q1
>> q1
>> q1
>> q2
>> q1
>> q1
>> q2
>>
```

Workspace

Name	Value
a0_100	-2.4286e-17
a0_25	-2.4286e-17
an_100	1x100 double
an_25	1x25 double
bn_100	1x100 double
bn_25	1x25 double
f1	100
f2	50
fs	1000
n	100
N_100	75
N_25	25
Num_100	100
Num_25	25
reconstructed_...	1x1000 double
reconstructed_...	1x1000 double
t	1x1000 double
T	2
X_f	1x1000 double
x_t	1x1000 double

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Problem 1 c :.

when a_k increases the number of coefficients increase therefore the graph illustration will be more ~~Spooth~~ Smooth as there is more points.