Ψηφιακές Επικοινωνίες-1η Εργαστηριακή Άσκηση
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Μέρος 3: Εφαρμογή Α

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% Part 1
close all;
clear all;
clc;
Fs=2000;
Ts=1/Fs;
L=2000;
T=L*Ts;
t=0:Ts:(L-1)*Ts;
x=sin(2*pi*100*t)+ 0.3*sin(2*pi*150*(t-2))+ sin(2*pi*200*t);
figure(1)
plot(t,x)
title('Time domain plot of x (ANNA KOUTSONI)')
xlabel('t (sec)')
ylabel('Amplitude')
pause
axis([0 0.3 -2 2])
pause
N = 2^nextpow2(L
Fo=Fs/N;
f=(0:N-1)*Fo;
X=fft(x,N);
figure(2)
plot((f(1:N)),abs(X(1:N)))
title('Frequency domain plot of x (ANNA KOUTSONI)')
xlabel('f (Hz)')
ylabel('Amplitude')
pause
figure(3)
f=f-Fs/2;
X=fftshift(X);
plot(f,abs(X));title('Two sided spectrum of x (ANNA KOUTSONI)'); xlabel('f (Hz)');
ylabel('Amplitude')
pause
power=X.*conj(X)/N/L;
figure(4)
plot(f,power)
xlabel('Frequency (Hz)')
ylabel('Power')
title('{\bf Periodogram} (ANNA KOUTSONI)')
pause
disp('Part2')
%Part 2
sz=size(x);
n=randn(sz);
figure(5)
plot(t,n)
axis([0 0.3 -2 2])
title('Time domain plot of n (ANNA KOUTSONI)')
xlabel('t (sec)')
ylabel('Noise')
```

```
pause
Nf=fft(n,N);
powern=Nf.*conj(Nf)/N/L;
figure(6)
f1=(0:N-1)*Fo;
plot(f1,powern)
xlabel('Frequency (Hz)')
ylabel('Power')
title('{\bf Periodogram} (ANNA KOUTSONI)')
pause
s=x+n;
figure(7)
plot(t,s)
axis([0 0.2 -2 2])
title('Time domain plot of s (ANNA KOUTSONI)')
xlabel('t (sec)')
ylabel('Amplitude')
pause
figure(8)
S=fft(s,N);
S=fftshift(S);
plot(f,abs(S));title('Two sided spectrum of s (ANNA KOUTSONI)'); xlabel('f (Hz)');
ylabel('Amplitude');
pause
disp('Part3')
%Part 3
Fs=2000;
Ts=1/Fs;
L=2000;
T=L*Ts;
t=0:Ts:(L-1)*Ts;
k=sin(2*pi*750*t);
sk=s.*k;
figure(9)
plot(t,sk)
axis([0 0.2 -2 2])
title('Time domain plot of sk (ANNA KOUTSONI)')
xlabel('t (sec)')
ylabel('Amplitude')
pause
SK=fft(sk,N);
SK=fftshift(SK);
figure(10)
plot((f(1:N)),abs(SK(1:N)))
title('Frequency domain plot of SK (ANNA KOUTSONI)')
xlabel('f (Hz)')
ylabel('Amplitude')
pause
```

Figure 1

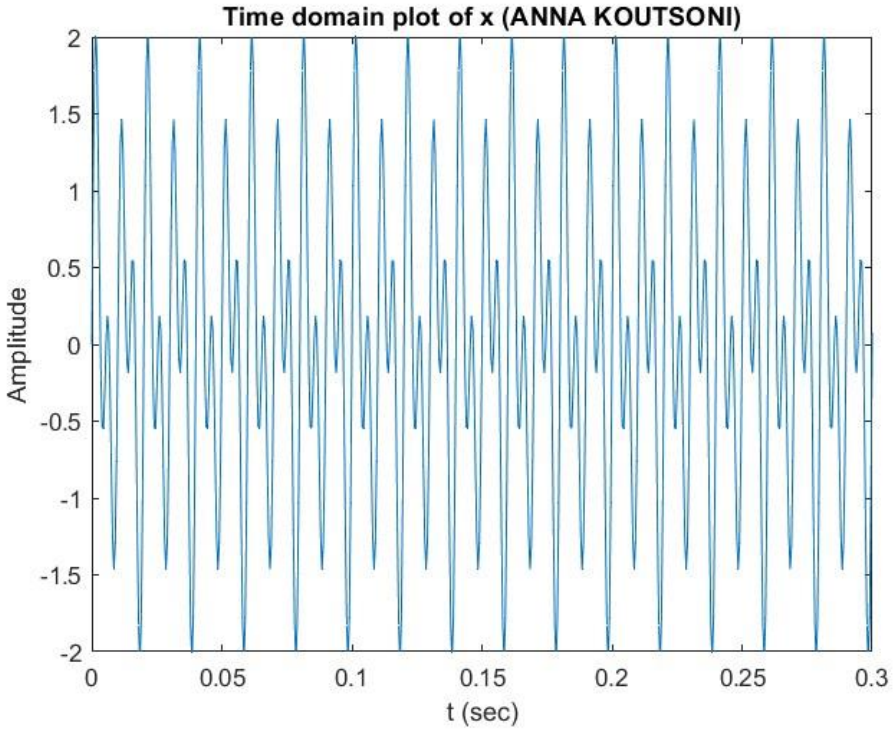

Figure 2

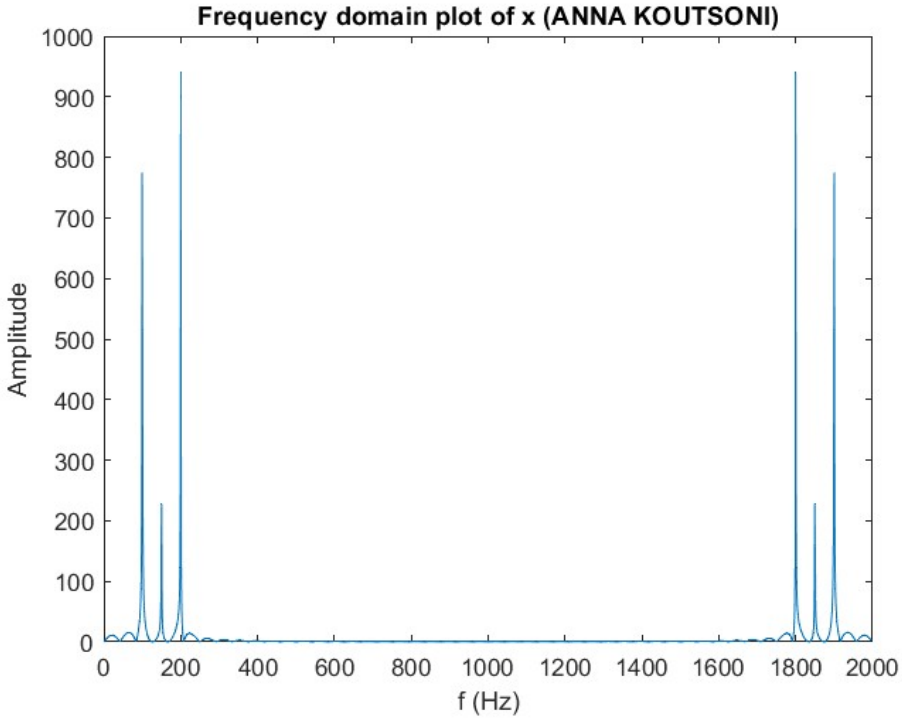

Figure 3

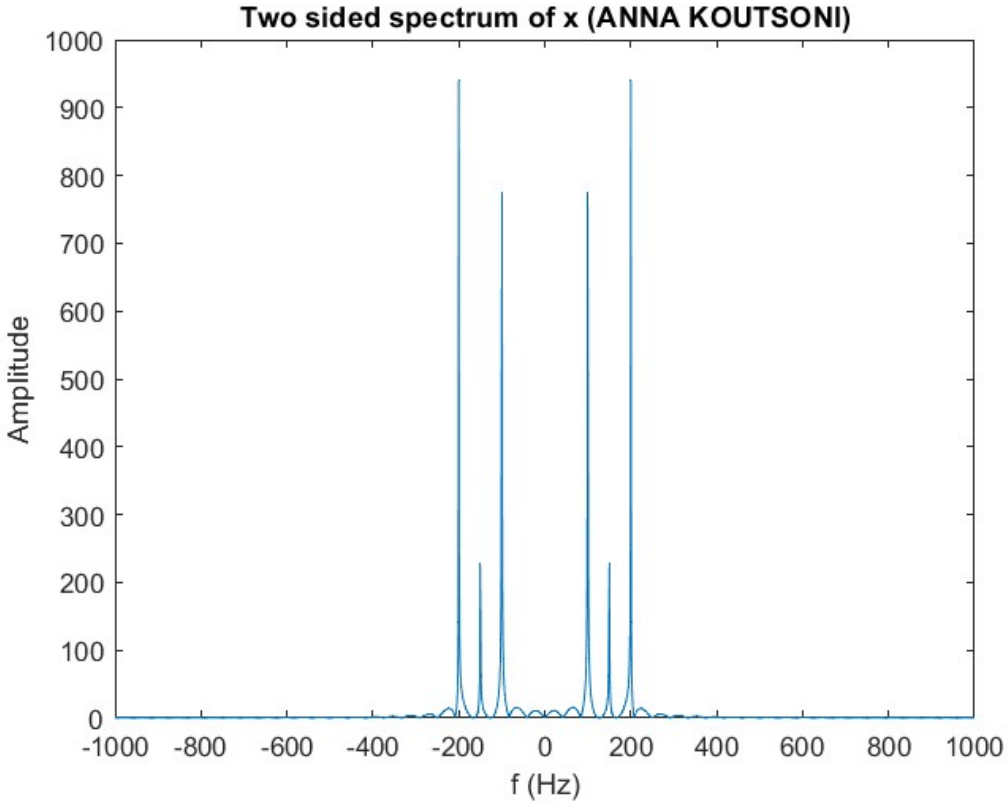

Figure 4

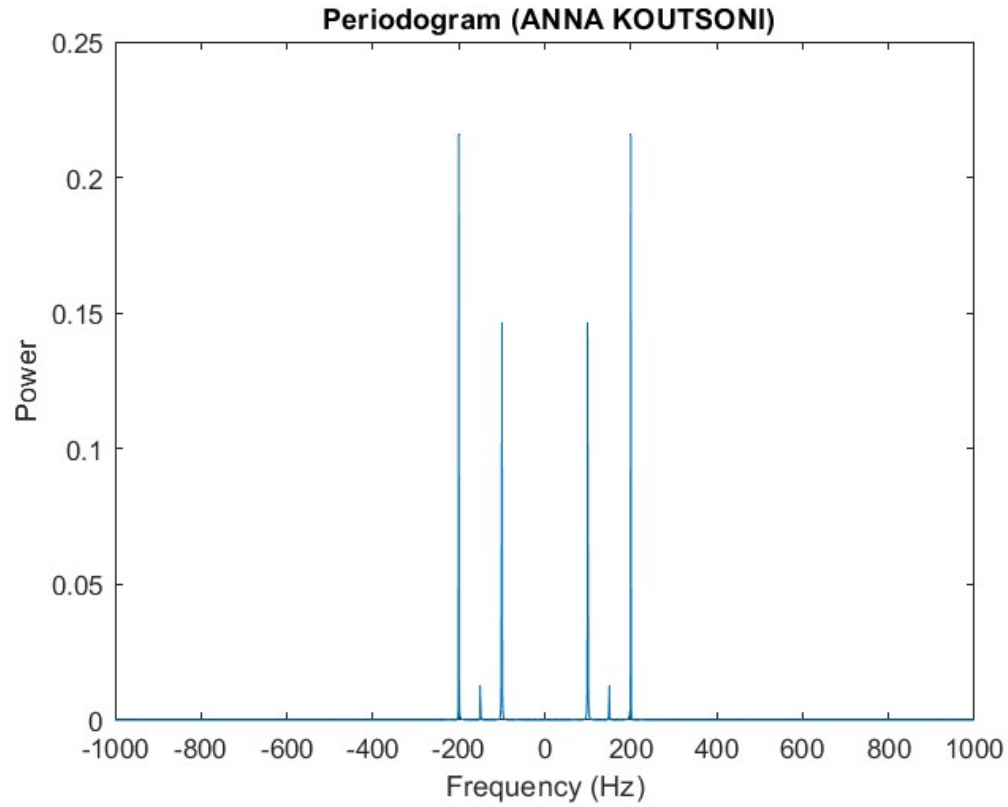

Figure 5

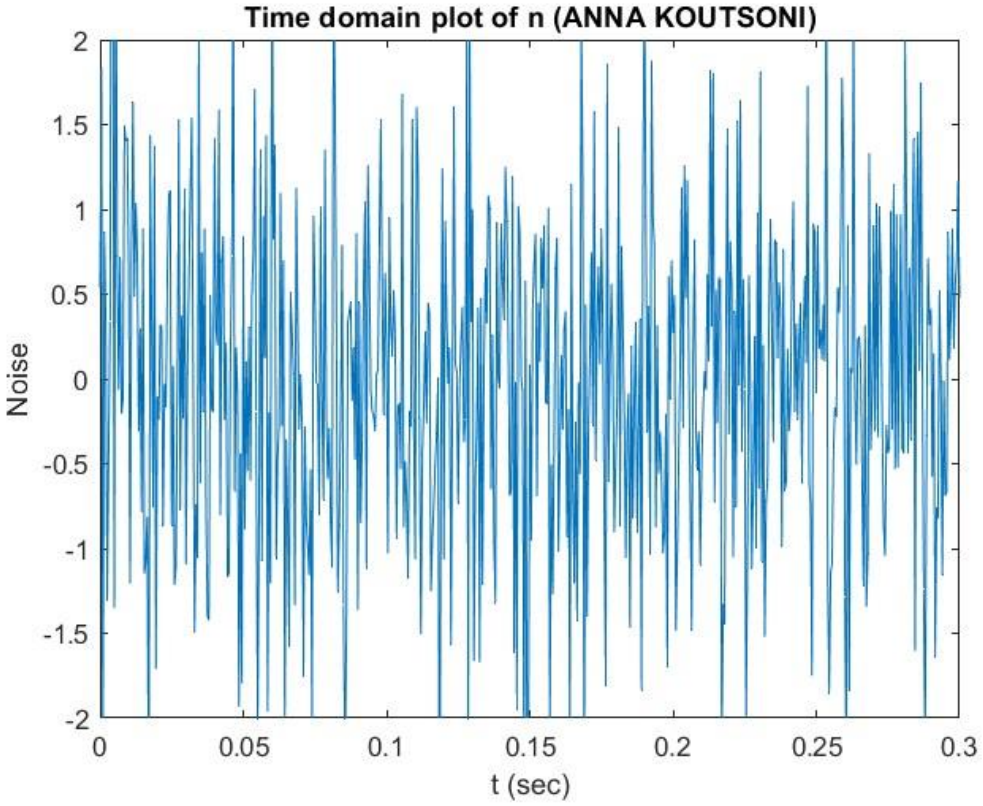

Figure 6

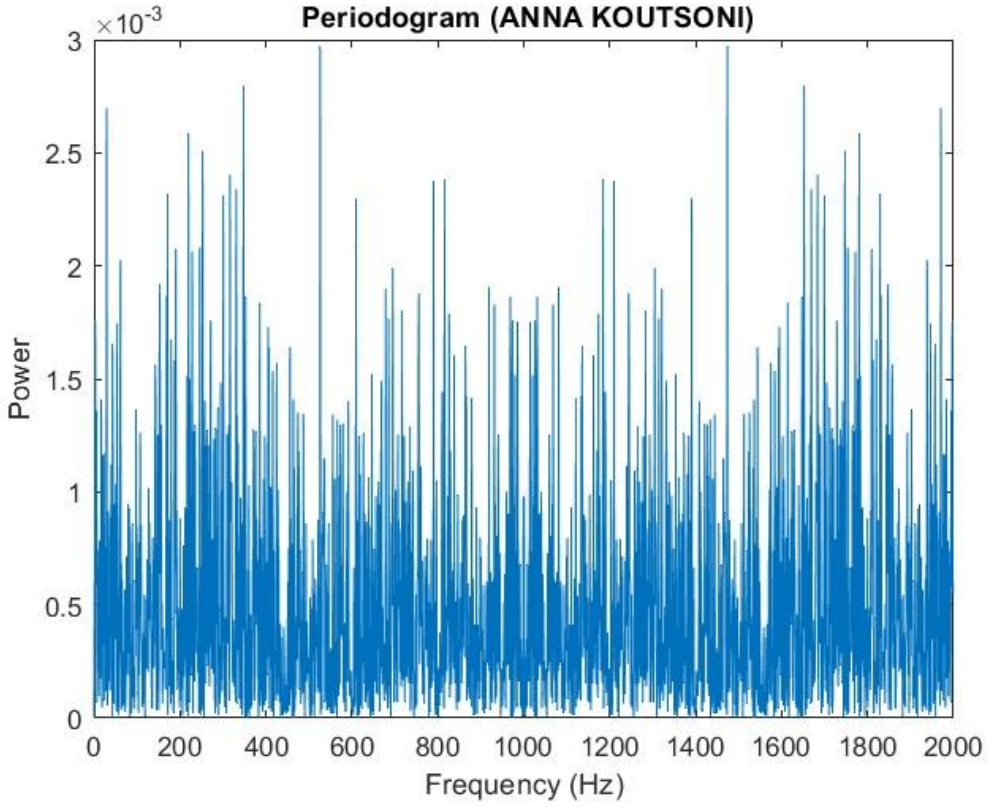

Figure 7

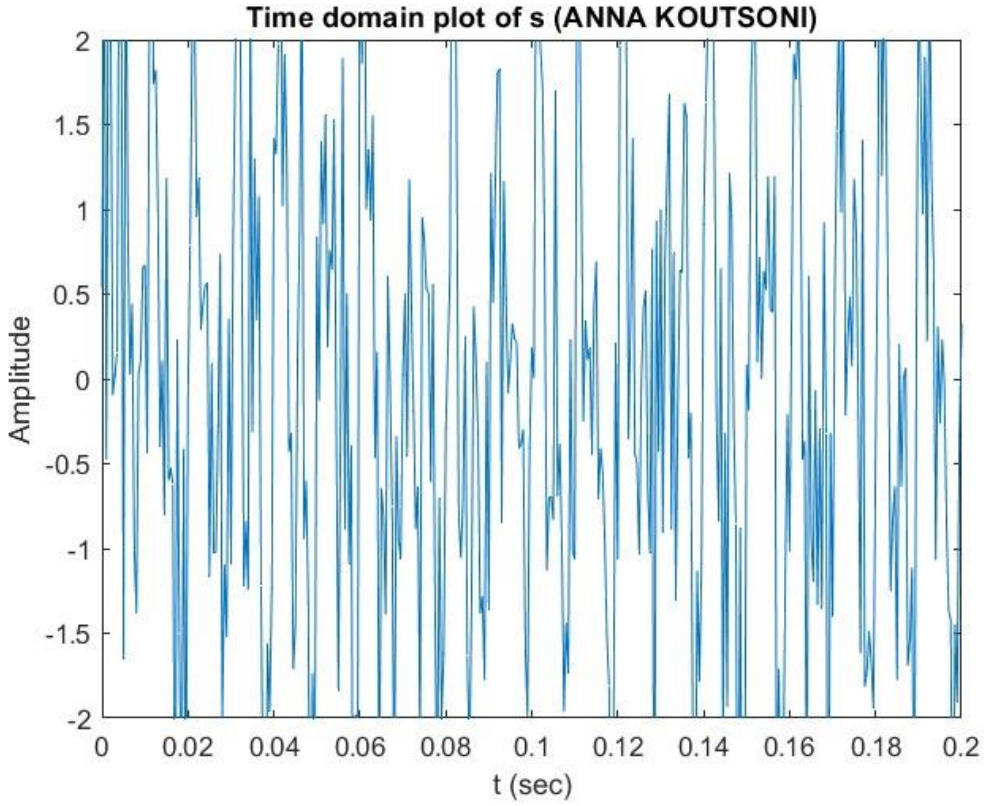

Figure 8

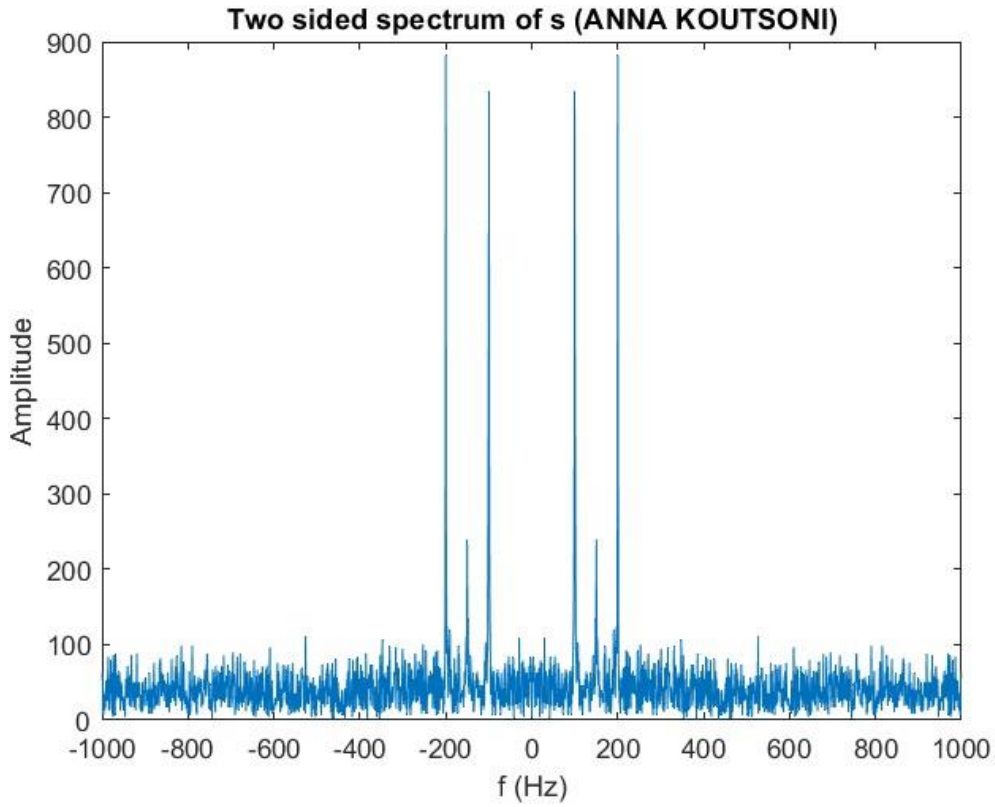

Figure 9

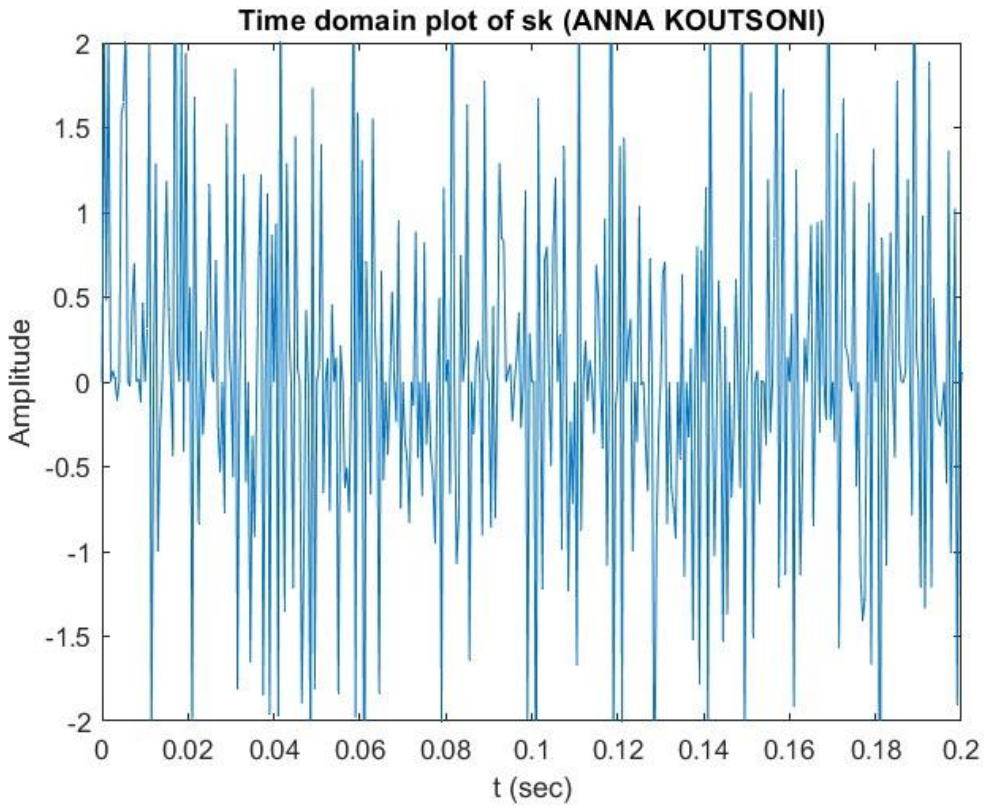
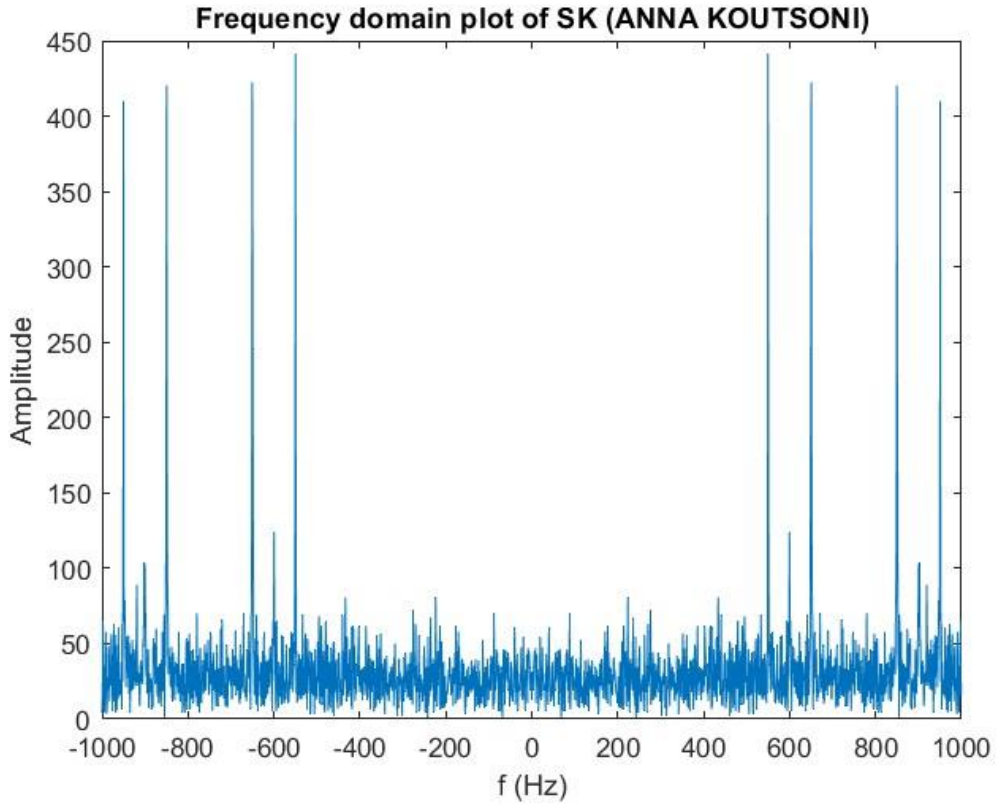
Figure 10