Άσκηση 3

Ενδεικτικός κώδικας matlab

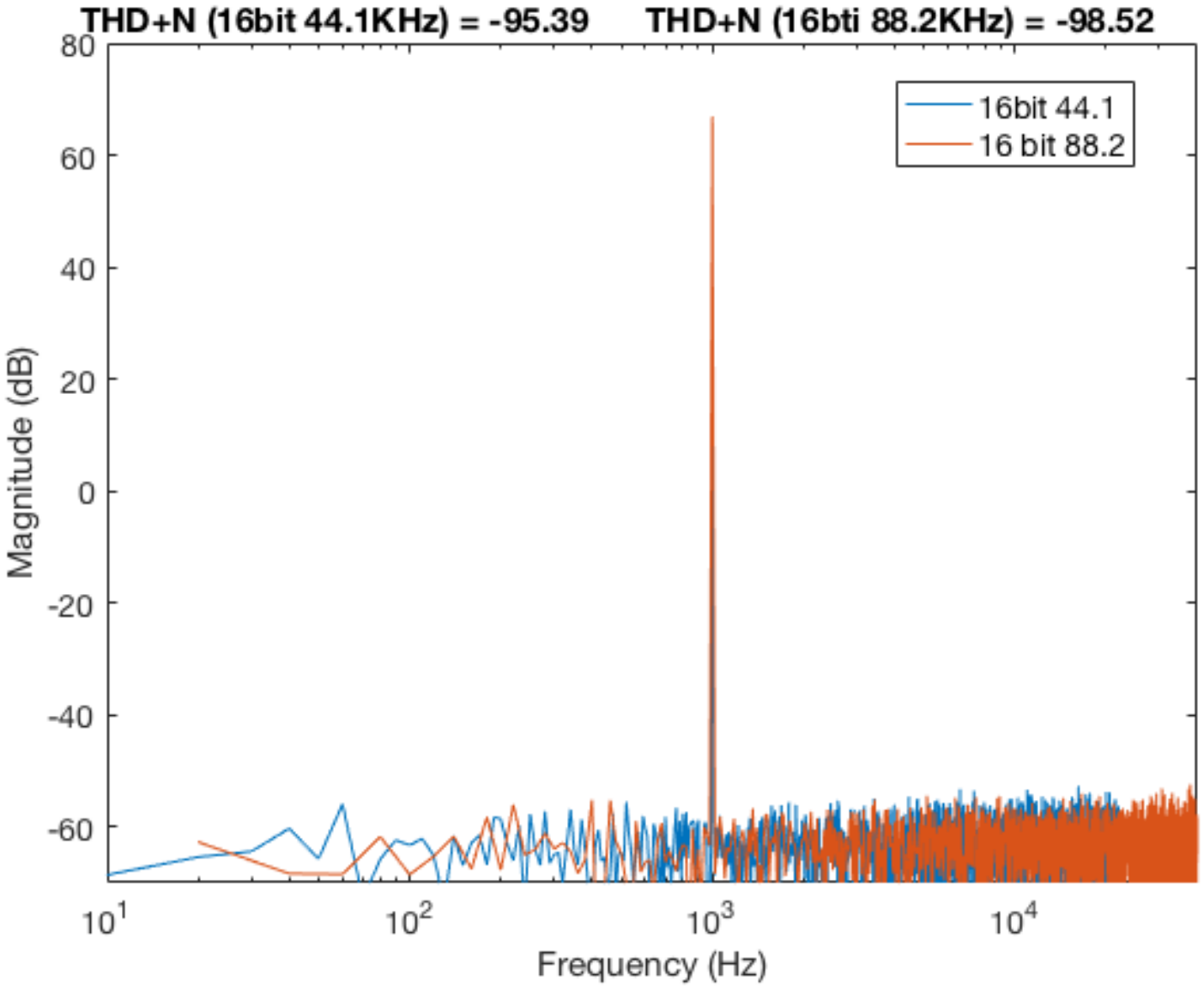
```
clear all
fs1=44100;  fs2=88200;

T0_1=1;  T0_2=1;
t1=0:1/fs1:T0_1-1/fs1;   t2=0:1/fs2:T0_2-1/fs2;

s1=sin(2*pi*1000*t1);   s2=sin(2*pi*1000*t2);
w1=hann(length(s1));w2=hann(length(s2));
sw1=s1.*w1';sw2=s2.*w2';

Out16_44=QuantiseAudio(sw1,16,1,-1,0,1);
Out16_88=QuantiseAudio(sw2,16,1,-1,0,1);
figure;
plotSpectrum(Out16_44,44100,1,1);  hold on
plotSpectrum(Out16_88,88200,1,1);
```

Άσκηση 3

Ενδεικτικός κώδικας matlab

```
l1=length(Out16_44); l2=length(Out16_88);
fvec1=fs1/l1.*(0:l1/2-1);
fvec2=fs2/l2.*(0:l2/2-1);

Out16_44_sp=abs(fft(Out16_44));
[m,c1]=max(Out16_44_sp);

thdn16_44=10*log10(CalcTHDN(Out16_44_sp,fvec1,c1))

Out16_88_sp=abs(fft(Out16_88));
[m,c2]=max(Out16_88_sp);

thdn16_88=10*log10(CalcTHDN(Out16_88_sp,fvec2,c2))
```

Άσκηση 3


THD+N (16bit 44.1KHz) = -95.39
THD+N (16bti 88.2KHz) = -98.52
16bit 44.1
16 bit 88.2
Magnitude (dB)
Frequency (Hz)
80
60
40
20
0
-20
-40
-60
10^1
10^2
10^3
10^4

Άσκηση 3

Ενδεικτικός κώδικας matlab

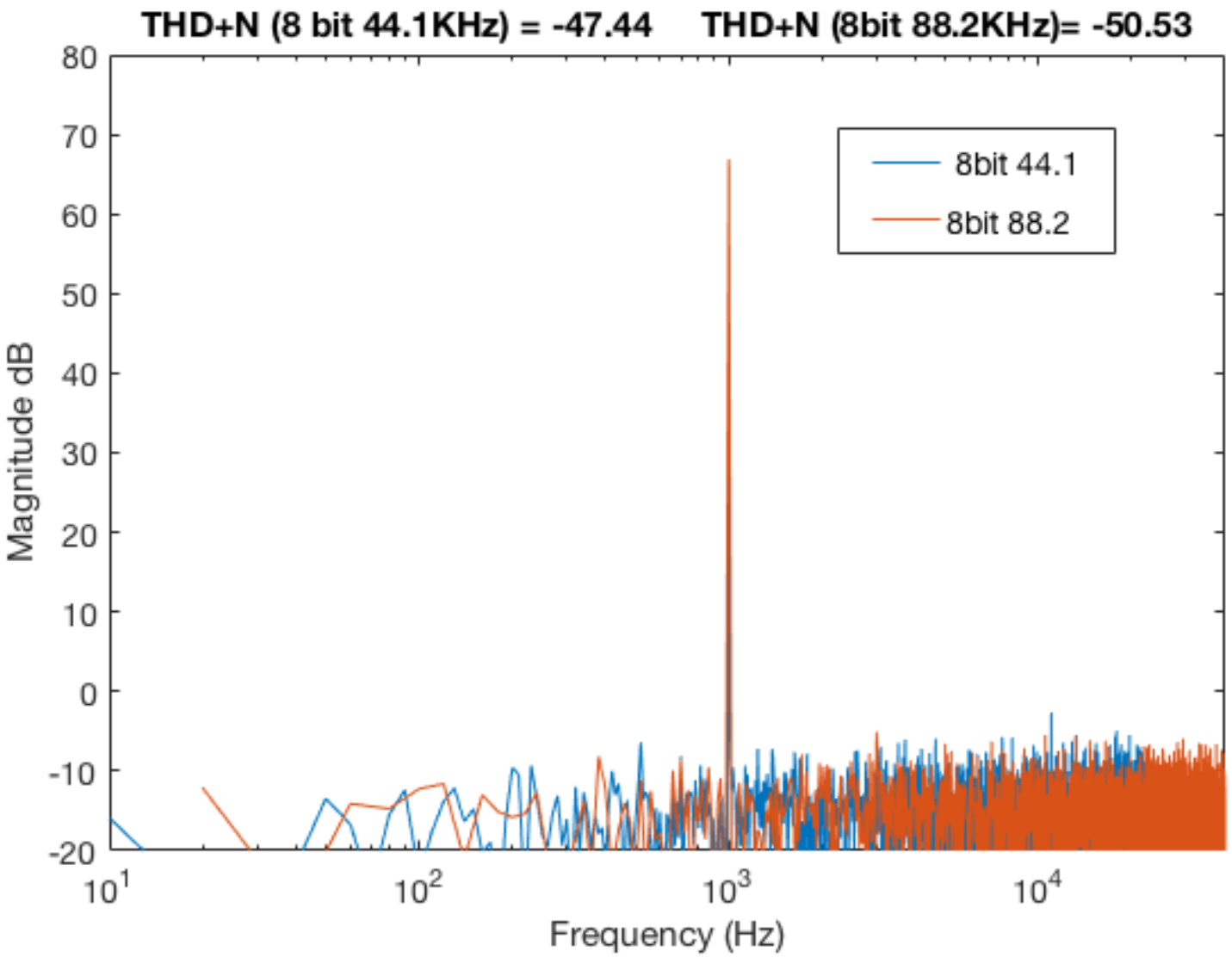
```
Out8_44=QuantiseAudio(Out16_44,8,1,-1,0,1);
Out8_88=QuantiseAudio(Out16_88,8,1,-1,0,1);

figure;

plotSpectrum(Out8_44,44100,1,1); hold on
plotSpectrum(Out8_88,88200,1,1);
```

Άσκηση 3

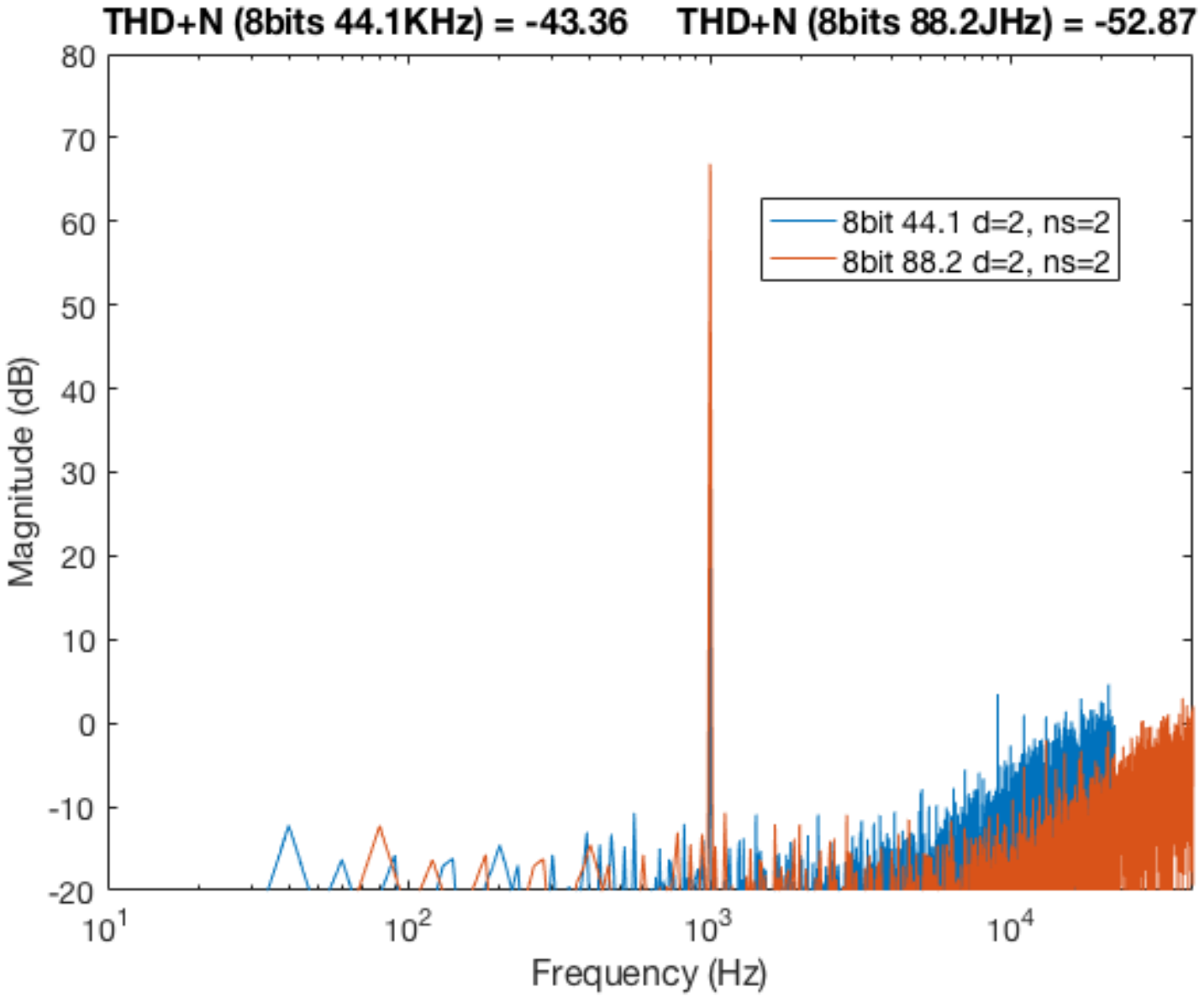
Ενδεικτικός κώδικας matlab

```
l1=length(Out8_44); l2=length(Out8_88);
fvec1=fs1/l1.*(0:l1/2-1); fvec2=fs2/l2.*(0:l2/2-1);

Out8_44_sp=abs(fft(Out8_44));
[m,c1]=max(Out8_44_sp);
thdn8_44=10*log10(CalcTHDN(Out8_44_sp,fvec1,c1))

Out8_88_sp=abs(fft(Out8_88));
[m,c2]=max(Out8_88_sp);
thdn8_88=10*log10(CalcTHDN(Out8_88_sp,fvec2,c2))
```

Άσκηση 3


THD+N (8 bit 44.1KHz) = -47.44
THD+N (8bit 88.2KHz)= -50.53
8bit 44.1
8bit 88.2
Magnitude dB
Frequency (Hz)
80
70
60
50
40
30
20
10
0
-10
-20
10^1
10^2
10^3
10^4

Άσκηση 3


THD+N (8bits 44.1KHz) = -43.36
THD+N (8bits 88.2JHz) = -52.87
8bit 44.1 d=2, ns=2
8bit 88.2 d=2, ns=2
Magnitude (dB)
Frequency (Hz)
80
70
60
50
40
30
20
10
0
-10
-20
10^1
10^2
10^3
10^4

Άσκηση 3

Σκέλος 2: Ενδεικτικός κώδικας matlab

```
[speech,spFs]=audioread('speech.wav');
dataOvs = InterpolateZeros(speech,2);

firx2=[-850 0 245 0 -541 0 1041 0 -1865 0 3303 0 -6400 0 20670 32767 20670 0 -6400
0 3303 0 -1865 0 1041 0 -541 0 245 0 -850];

dataOvsFilt=filter(firx2/32767,1,dataOvs);

data8bitOvs = QuantiseAudio(dataOvsFilt',8,1,-1,2,0);
data8bit = QuantiseAudio(speech,8,1,-1,0,0);

audiowrite('out.wav',data8bitOvs,88200);
audiowrite('out_8bit.wav',data8bit,44100);
```