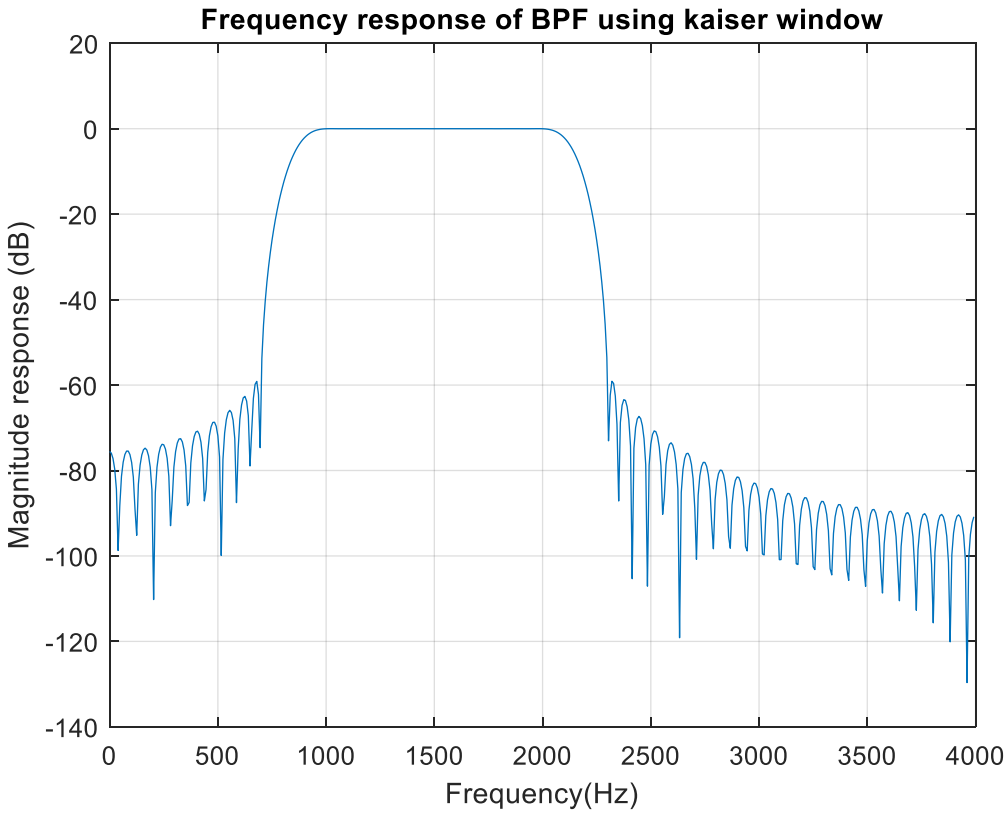
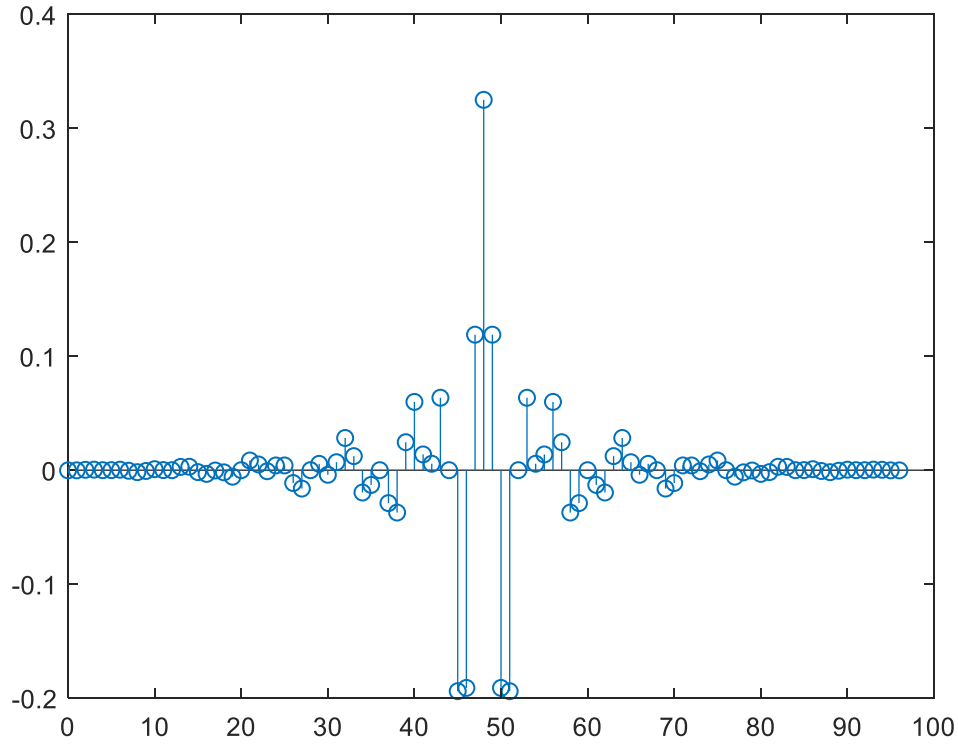
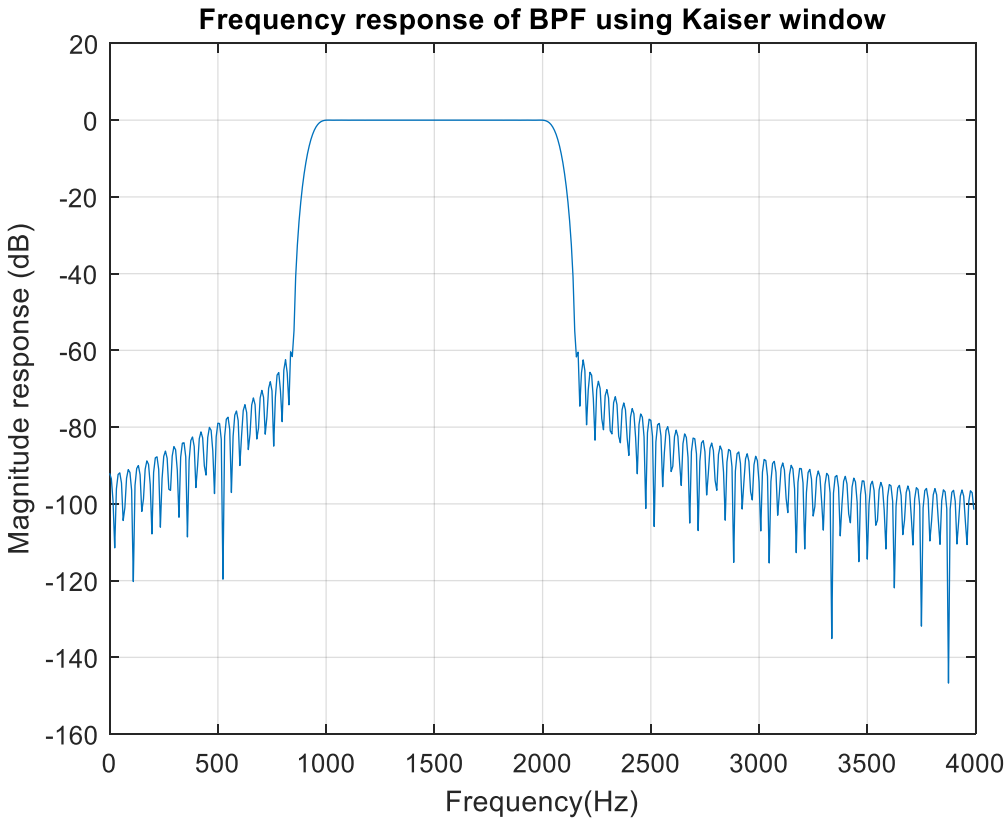
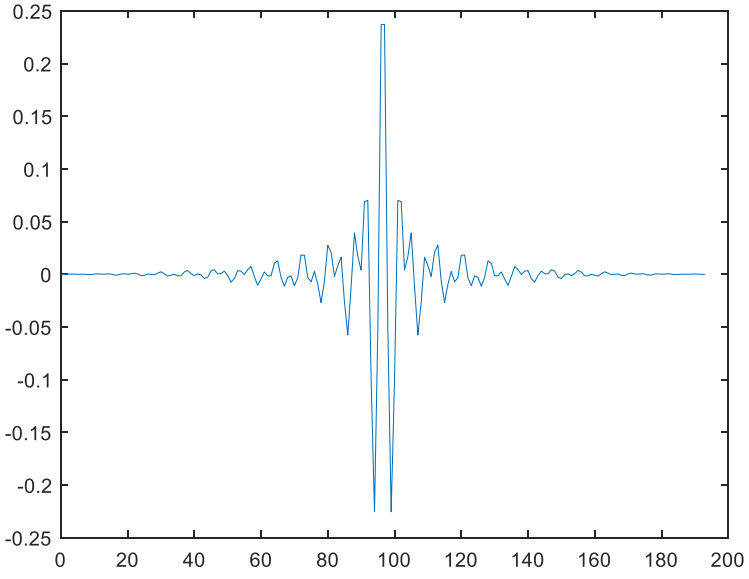
FIR BPF Using Kaiser Window



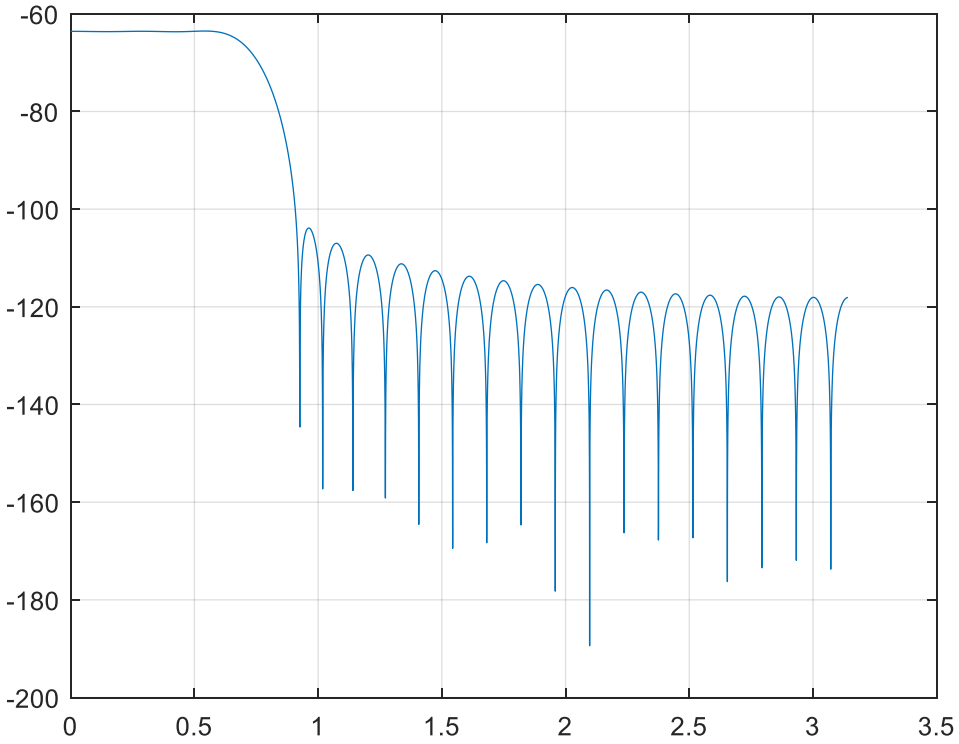


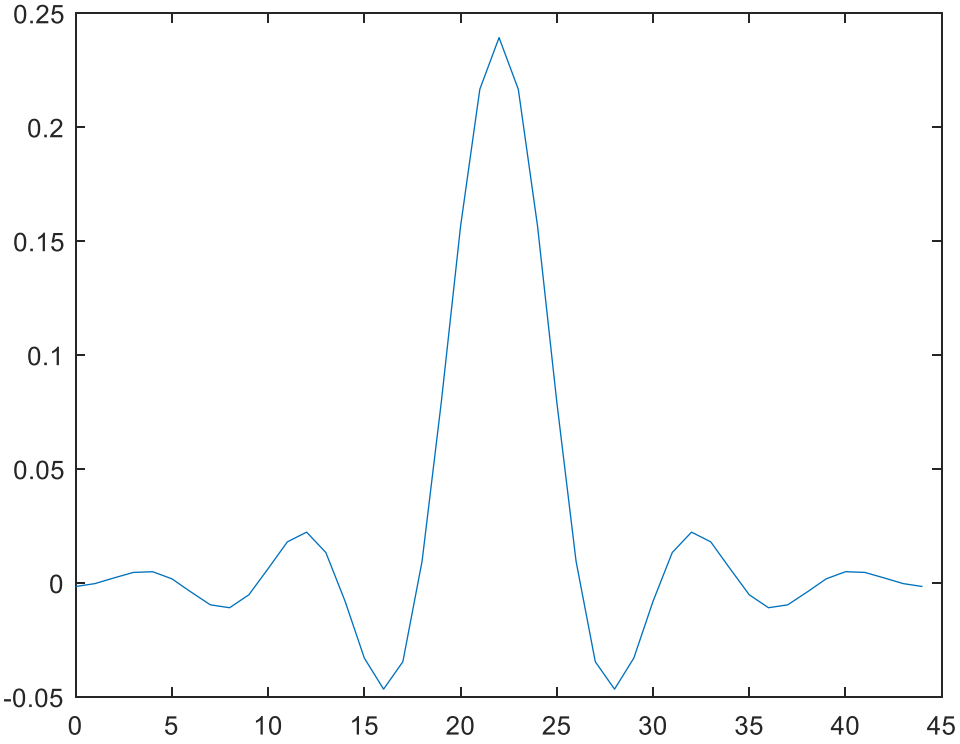

Frequency response of BPF using Kaiser window
Magnitude response (dB)
Frequency(Hz)
20
0
-20
-40
-60
-80
-100
-120
-140
-160
0
500
1000
1500
2000
2500
3000
3500
4000


0.25
0.2
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
-0.2
-0.25
0
20
40
60
80
100
120
140
160
180
200

Assignment 4

```
clc;clear all;close all;
Fs=10000;
fn=Fs/2;
delp=10^(0.01/20)-1;
dels=10^(-40/20);
del=min([delp,dels]);
tw=500;
twn=tw/Fs;
A=40;
N=ceil((A-7.95)/(14.36*twn));
if(rem(N,2)==0)
    N=N+1;
end
if(A<=21)
    beta=0;
elseif(A>21 && A<50)
    beta=0.5842*(A-21)^0.4+0.07886*(A-21);
else
    beta=0.1102*(A-8.7);
end
fc=1200/fn;
hn=fir1(N-1,fc,kaiser(N,beta));
[H,f]=freqz(hn,1512,Fs);
mag=20*log10(abs(H));
plot(f,mag);
grid on;
n=0:N-1;
figure;
plot(n,hn);
```


-60
-80
-100
-120
-140
-160
-180
-200
0
0.5
1
1.5
2
2.5
3
3.5


0.25
0.2
0.15
0.1
0.05
0
-0.05
0
5
10
15
20
25
30
35
40
45

CCS

Filtering of noisy signal using FIR filter

Name	Type	Value	Location
(x)= N	int	23	0x0000383C
(x)= i	int	25	0x00003840
(x)= k	int	11	0x00003844
(x)= j	int	25	0x00003848
(x)= n	int	15	0x0000384C
(x)= fp	double	2000.0	0x00003850
(x)= fs	double	5500.0	0x00003858
(x)= Fs	double	20000.0	0x00003860
▷ hd	double[14]	0x00003868	0x00003868
▷ Wn	double[14]	0x000038D8	0x000038D8
▷ h	double[28]	0x00003948	0x00003948
(x)= pi	double	3.1415926	0x00003A28
(x)= fc	double	0.1875	0x00003A30
(x)= TW	double	0.175	0x00003A38
▷ x	double[15]	0x00003A40	0x00003A40
▷ y	double[25]	0x00003A...	0x00003A...
(x)= num	double	17543.0	0x00003B80

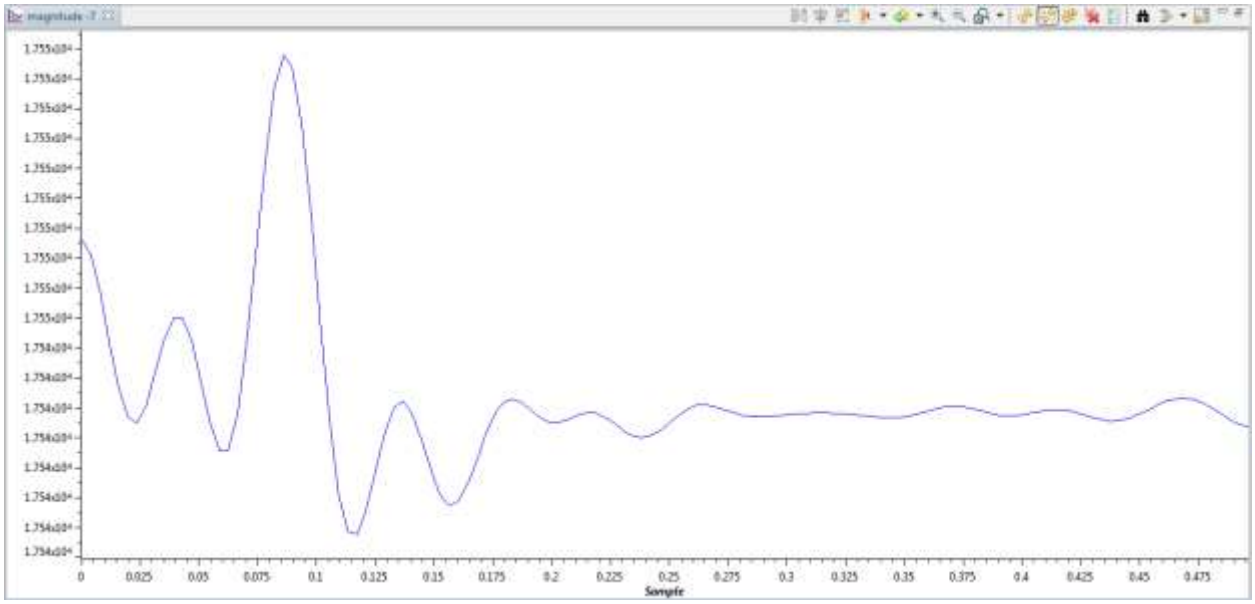
◢ hd	double[14]	0x00003868	0x00003868
(x)= [0]	double	0.01107380516997581	0x00003868
(x)= [1]	double	-0.02250791281109876	0x00003870
(x)= [2]	double	-0.03267555242512001	0x00003878
(x)= [3]	double	6.3968104354934e-009	0x00003880
(x)= [4]	double	0.04201143014190514	0x00003888
(x)= [5]	double	0.03751317595655698	0x00003890
(x)= [6]	double	-0.02436239028557041	0x00003898
(x)= [7]	double	-0.07957747290339276	0x000038A0
(x)= [8]	double	-0.04060396804959817	0x000038A8
(x)= [9]	double	0.1125395459625838	0x000038B0
(x)= [10]	double	0.2940799914097119	0x000038B8
(x)= [11]	double	0.0	0x000038C0
(x)= [12]	double	0.0	0x000038C8
(x)= [13]	double	0.0	0x000038D0

Wn	double[14]	0x000038D8	0x000038D8
(x)= [0]	double	0.0	0x000038D8
(x)= [1]	double	0.02025351250647911	0x000038E0
(x)= [2]	double	0.07937323095051585	0x000038E8
(x)= [3]	double	0.1725696275045671	0x000038F0
(x)= [4]	double	0.2922924846359677	0x000038F8
(x)= [5]	double	0.4288425688078288	0x00003900
(x)= [6]	double	0.5711574046700082	0x00003908
(x)= [7]	double	0.7077074909905371	0x00003910
(x)= [8]	double	0.8274303522452012	0x00003918
(x)= [9]	double	0.9206267545630691	0x00003920
(x)= [10]	double	0.9797464799445257	0x00003928
(x)= [11]	double	0.0	0x00003930
(x)= [12]	double	0.0	0x00003938
(x)= [13]	double	0.0	0x00003940

h	double[28]	0x00003948	0x00003948
(x)= [0]	double	0.0	0x00003948
(x)= [1]	double	-0.00045586429361433	0x00003950
(x)= [2]	double	-0.002593564169074739	0x00003958
(x)= [3]	double	1.103895194070424e-009	0x00003960
(x)= [4]	double	0.01227962529928784	0x00003968
(x)= [5]	double	0.01608724674134998	0x00003970
(x)= [6]	double	-0.01391475960706421	0x00003978
(x)= [7]	double	-0.05631757368782754	0x00003980
(x)= [8]	double	-0.03359695558583191	0x00003988
(x)= [9]	double	0.1036069169595349	0x00003990
(x)= [10]	double	0.2881238364057815	0x00003998
(x)= [11]	double	0.3749999999999998	0x000039A0
(x)= [12]	double	0.2881238364057815	0x000039A8
(x)= [13]	double	0.1036069169595349	0x000039B0
(x)= [14]	double	-0.03359695558583191	0x000039B8
(x)= [15]	double	-0.05631757368782754	0x000039C0
(x)= [16]	double	-0.01391475960706421	0x000039C8
(x)= [17]	double	0.01608724674134998	0x000039D0
(x)= [18]	double	0.01227962529928784	0x000039D8
(x)= [19]	double	1.103895194070424e-009	0x000039E0
(x)= [20]	double	-0.002593564169074739	0x000039E8
(x)= [21]	double	-0.00045586429361433	0x000039F0
(x)= [22]	double	0.0	0x000039F8
(x)= [23]	double	0.0	0x00003A00
(x)= [24]	double	0.0	0x00003A08
(x)= [25]	double	0.0	0x00003A10
(x)= [26]	double	0.0	0x00003A18
(x)= [27]	double	0.0	0x00003A20

x	double[15]	0x00003A40	0x00003A40
(x)= [0]	double	0.16838	0x00003A40
(x)= [1]	double	0.6453652436214624	0x00003A48
(x)= [2]	double	1.052186509671091	0x00003A50
(x)= [3]	double	1.126206526231247	0x00003A58
(x)= [4]	double	0.8982952869765152	0x00003A60
(x)= [5]	double	0.05627005358979274	0x00003A68
(x)= [6]	double	-0.3576852002664083	0x00003A70
(x)= [7]	double	-0.8768664931109317	0x00003A78
(x)= [8]	double	-0.7889365427914009	0x00003A80
(x)= [9]	double	-0.5469253303315658	0x00003A88
(x)= [10]	double	0.02748989282041455	0x00003A90
(x)= [11]	double	0.7154551569113528	0x00003A98
(x)= [12]	double	1.04189647655077	0x00003A...
(x)= [13]	double	1.071656559351552	0x00003A...
(x)= [14]	double	0.9100353736866144	0x00003A...

y	double[25]	0x00003AB8	0x00003A...
(x)= [0]	double	0.1754301607693786	0x00003A...
(x)= [1]	double	0.6453652436214624	0x00003A...
(x)= [2]	double	1.052186509671091	0x00003A...
(x)= [3]	double	1.126206526231247	0x00003A...
(x)= [4]	double	0.8982952869765152	0x00003A...
(x)= [5]	double	0.05627005358979274	0x00003AE0
(x)= [6]	double	-0.3576852002664083	0x00003AE8
(x)= [7]	double	-0.8768664931109317	0x00003AF0
(x)= [8]	double	-0.7889365427914009	0x00003AF8
(x)= [9]	double	-0.5469253303315658	0x00003B00
(x)= [10]	double	0.002912019654191619	0x00003B08
(x)= [11]	double	0.2537756956429454	0x00003B10
(x)= [12]	double	0.657805520954374	0x00003B18
(x)= [13]	double	1.024233383215459	0x00003B20
(x)= [14]	double	1.11207123778947	0x00003B28
(x)= [15]	double	0.8058853676613326	0x00003B30
(x)= [16]	double	0.2074470930695118	0x00003B38
(x)= [17]	double	-0.4265569808201331	0x00003B40
(x)= [18]	double	-0.8352781735400341	0x00003B48
(x)= [19]	double	-0.8676638325397316	0x00003B50
(x)= [20]	double	-0.5148652943136953	0x00003B58
(x)= [21]	double	0.0916762491623092	0x00003B60
(x)= [22]	double	0.7018949575688326	0x00003B68
(x)= [23]	double	1.042893889410907	0x00003B70
(x)= [24]	double	0.9972513240093671	0x00003B78


1.755x10⁴
1.755x10⁴
1.755x10⁴
1.755x10⁴
1.755x10⁴
1.755x10⁴
1.755x10⁴
1.755x10⁴
1.755x10⁴
1.755x10⁴
1.754x10⁴
1.754x10⁴
1.754x10⁴
1.754x10⁴
1.754x10⁴
1.754x10⁴
1.754x10⁴
0
0.025
0.05
0.075
0.1
0.125
0.15
0.175
0.2
0.225
0.25
0.275
0.3
0.325
0.35
0.375
0.4
0.425
0.45
0.475
Sample