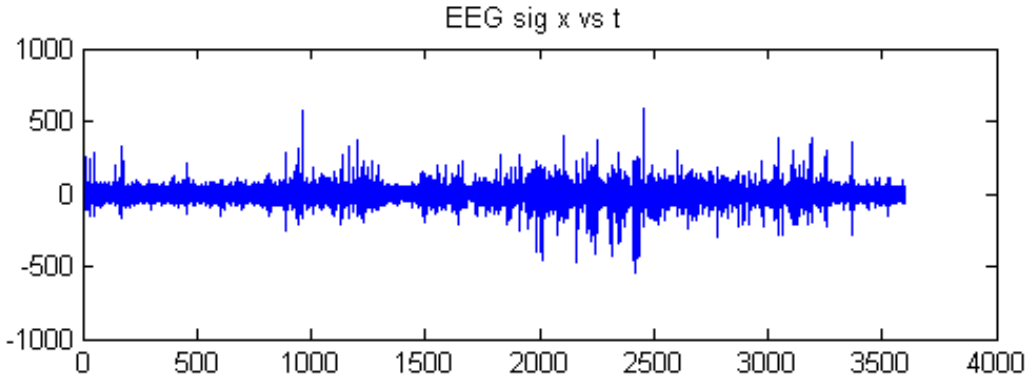
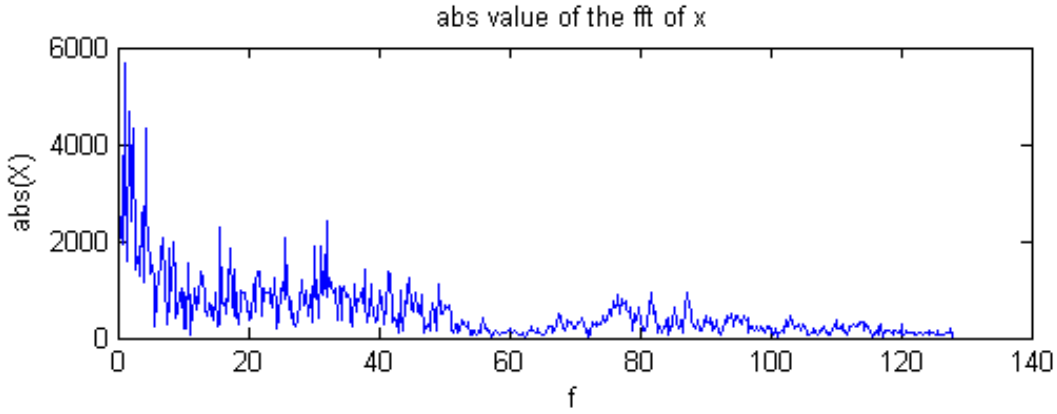
4.

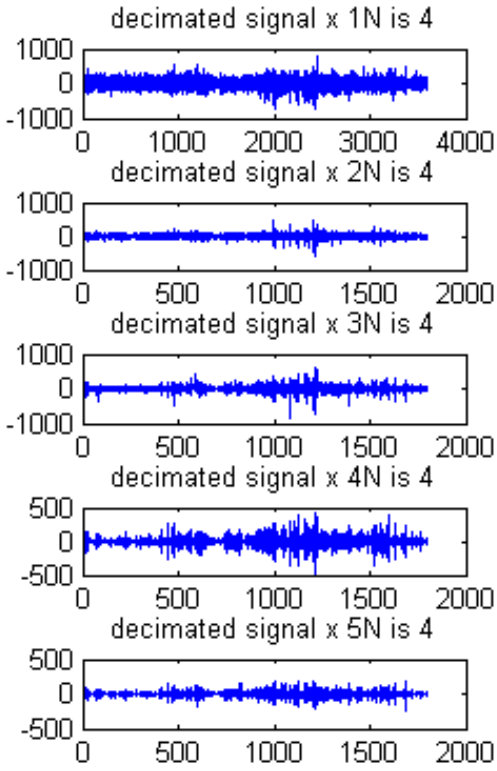
Medeiros: db1,db6;

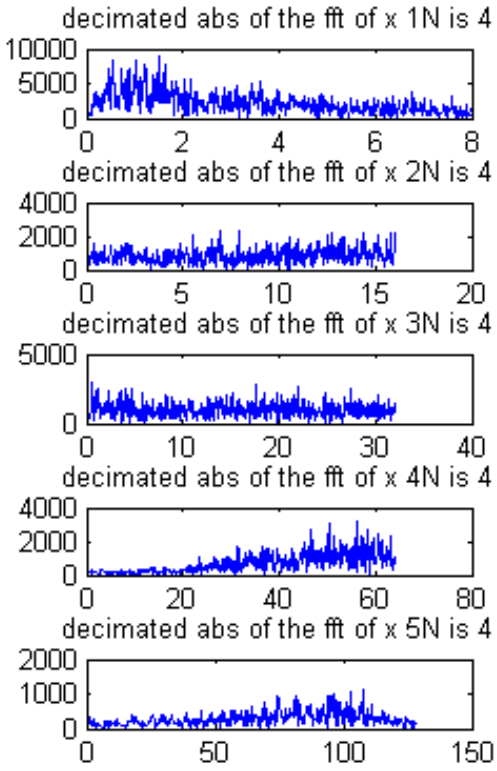
```
clear; clc; close all;

load EEG4wlt;

sr=256;   % Fs= sampling frequency= 1/T, where T=sampling period=50ms. sr=Fs;
% This is more than sufficient to sample the given signal.

t=[1/sr:1/sr:(length(x)/sr)]'; % by utilizing the given sampling rate sr, we split  a total
time
% time=sapmles/sampling rate=3600 second=60 minutes= 1hr.
lx=length(t);

figure
plot(t,x),title('EEG Signal'),xlabel('t,time'),ylabel('x');
dbname='db6';  % Daubechis 8
nfft=1024; % Defining an nfft to perform the fft .
fx=fft(x,nfft);% performing the fft
afx=abs(fx(1:nfft/2+1));  % achieving absolute value of the fft ;
f=(0:nfft/2)/nfft*sr; % defining the discrete frequency domain based on the nfft point DFT.
fgn=1 % figure iteration number.
figure(fgn)
subplot(211),plot(t,x), title ('EEG sig x vs t '),
subplot(212),plot(f,afx),title('abs value of the fft of x'),xlabel('f'),ylabel('abs(X)');
N=4; % filter level to decimate waves.
for a=1:3
[C,L]=wavedec(x,N,dbname); % Decimation of waves. returning values and coefficients to varia
bles C and L
begin=1;
fgn=fgn+1; % incrementing the figure counter
figure(fgn)
str='';

for k=1:N+1
fin=begin+L(k)-1;
wc(a*k)={C(begin:fin)}; % Allocating the respective decimated signal to separate cells
d=cell2mat(wc(a*k)); %placing the cells in one variable.
fd=fft(d,nfft); % taking the fft of the cell with the decimated signals.
afd=abs(fd(1:nfft/2+1)); % Now the absolute value of the function.
begin=fin+1;
if k<2
    p=N % in the case we are going through our first iteration , we set p to level 3
else
    p=p-1;
end
t=(0:L(k)-1)/(sr/2^p); % creating the appropriate time domain.
f=(0:nfft/2)/nfft*sr/2^p; %frequency representation.
figure(fgn)

str=num2str(k);
subplot(N+1,2,2*k-1),plot(t,d),title(['decimated signal x ',str,'N is ',num2str(N)]) % ploti
ng the raw value of the decimated portion of the function
subplot(N+1,2,2*k),plot(f,afd),title(['decimated abs of the fft of x ',str,'N is ',num2str(N
)]) % plotting the abs value of the same.

end
fgn=fgn+1;
N=N+1;
end
```

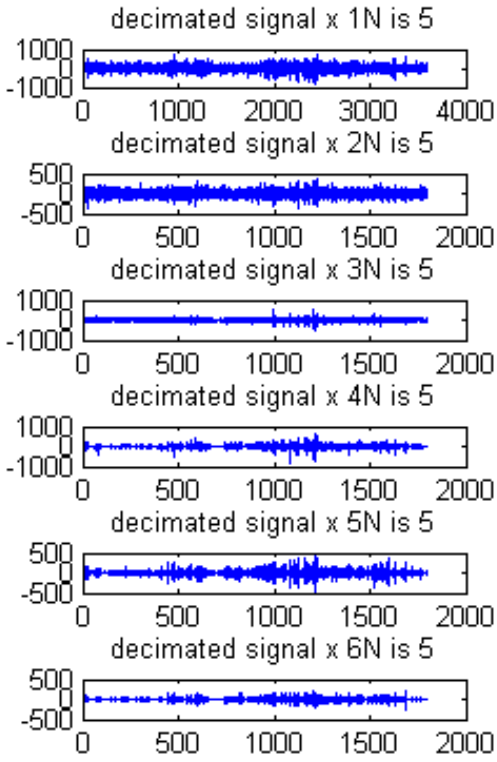
```
fgn =

     1


p =

     4


p =

     5


p =

     6
```

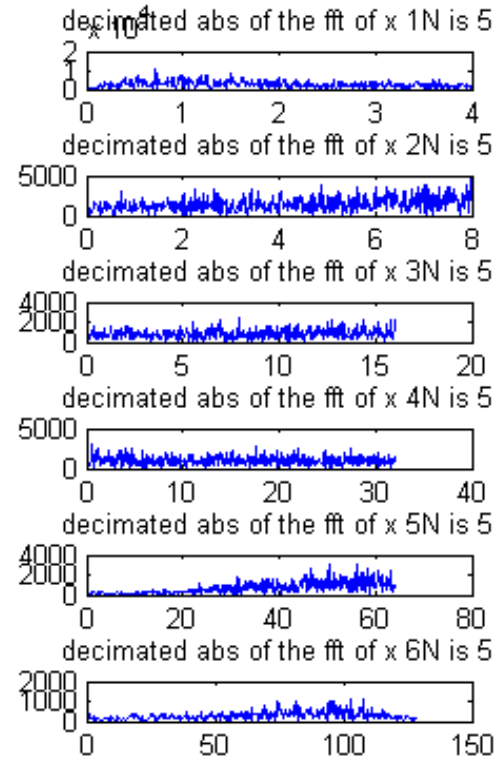

EEG sig x vs t
1000
500
0
-500
-1000
0
500
1000
1500
2000
2500
3000
3500
4000

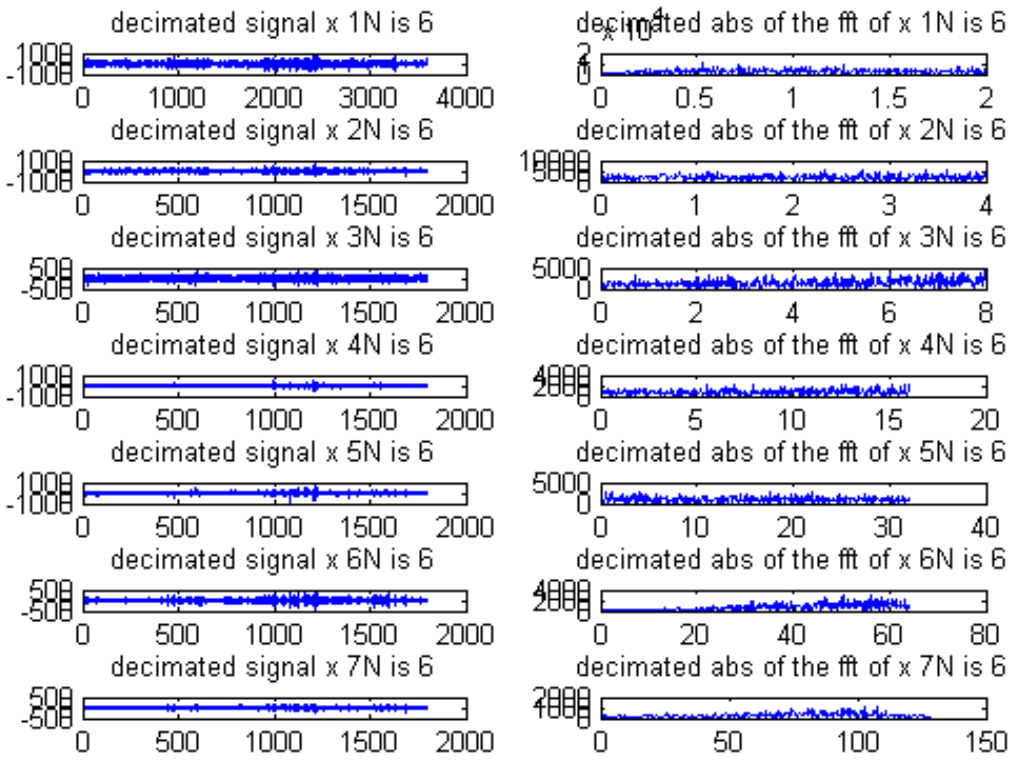

abs value of the fft of x
abs(X)
6000
4000
2000
0
0
20
40
60
80
100
120
140
f


decimated signal x 1N is 4
decimated signal x 2N is 4
decimated signal x 3N is 4
decimated signal x 4N is 4
decimated signal x 5N is 4


decimated abs of the fft of x 1N is 4
decimated abs of the fft of x 2N is 4
decimated abs of the fft of x 3N is 4
decimated abs of the fft of x 4N is 4
decimated abs of the fft of x 5N is 4


decimated signal x 1N is 5
decimated signal x 2N is 5
decimated signal x 3N is 5
decimated signal x 4N is 5
decimated signal x 5N is 5
decimated signal x 6N is 5


decimated abs of the fft of x 1N is 5
decimated abs of the fft of x 2N is 5
decimated abs of the fft of x 3N is 5
decimated abs of the fft of x 4N is 5
decimated abs of the fft of x 5N is 5
decimated abs of the fft of x 6N is 5



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