MATLAB Programs

Program 1

Write a program to plot of 2D and 3D spectrogram.

```
%plot of 2-D and 3-D spectrogram
clear all;
fp=fopen('watermark.wav','r');
t=0:0.016:2;  % 2 secs @ 16 kHz sample rate 256 samples at a
time = 0.016 seconds data taken at a time.
fseek(fp,44,-1);
x=fread(fp,10024);
[y,f,t] = spectrogram(x,window,256);
%length of window is 256 samples with y as spectrogram
%amplitude varying with time and frequency
surf(t,f,10*log10(abs(y)));
xlabel('Time');ylabel('Frequency (KHz)');
zlabel('amplitude');
```

Output

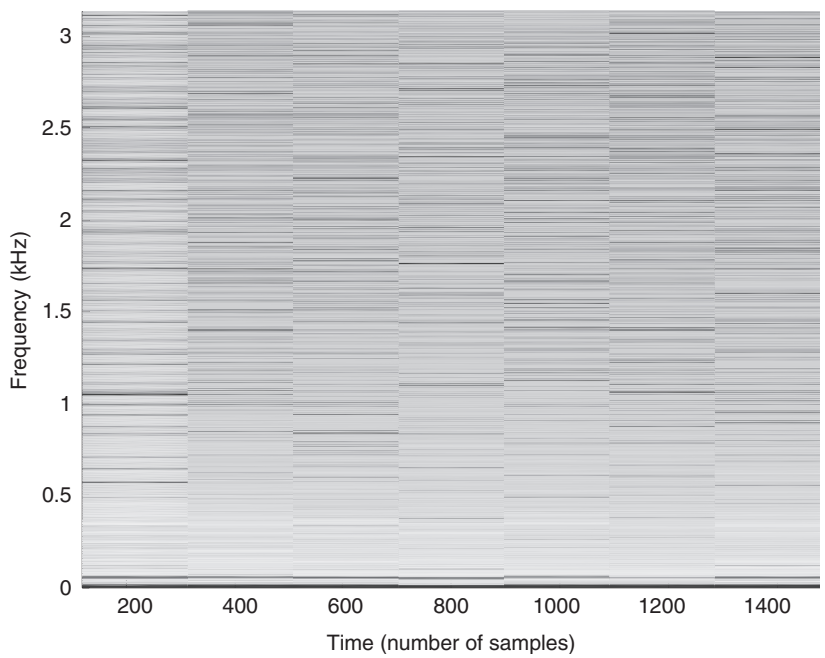

Figure 1 A 2D spectrogram of speech signal.

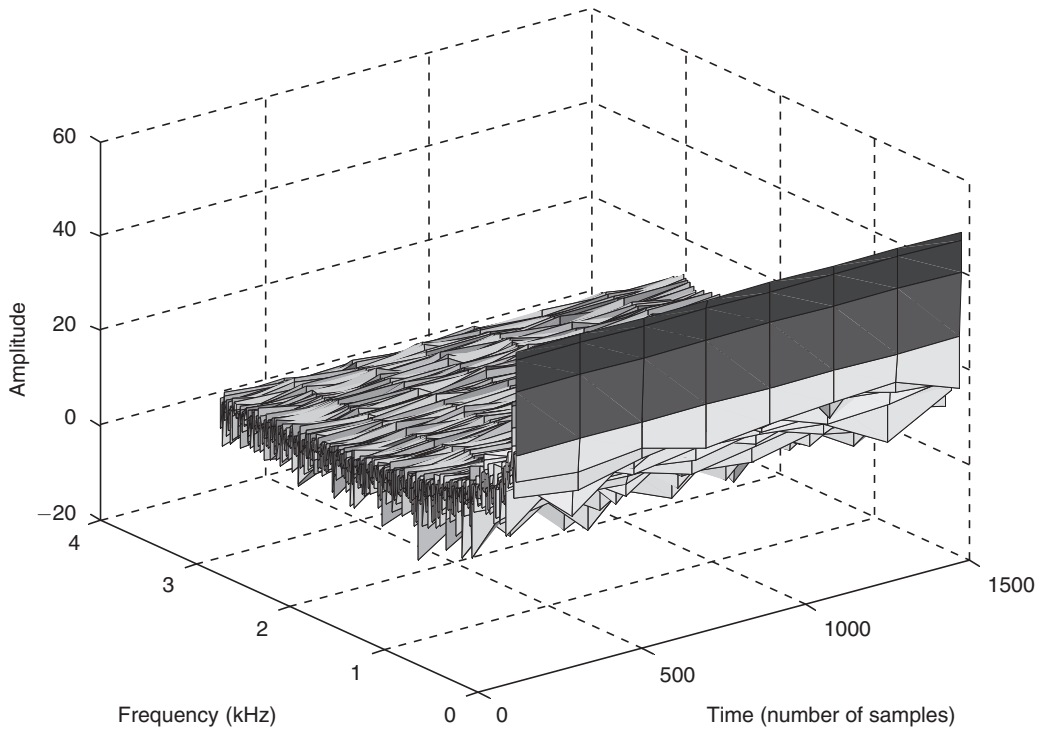

Figure 2 A 3D spectrogram of a speech signal.

Program 2

Write a program to show wavelet decomposition using Haar wavelet.

```
%wavelet decomposition using Haar wavelet
clear all;
f=[2,5,8,9,7,4,-1,1];
[ca,cd]=dwt(f,'db1');
disp(ca);
disp(cd);
[ca1,cd1]=dwt(ca,'db1');
disp(ca1);
disp(cd1);
[ca2,cd2]=dwt(ca1,'db1');
disp(ca2);
disp(cd2);
```

Output

```
The result of first decomposition is
4.9497   12.0208    7.7782         0
         2.1213   −0.7071    2.1213   −1.4142
The result of second decomposition is
12.0000    5.5000
  −5.0000    5.5000
The result of third decomposition is
12.3744    4.5962
```