

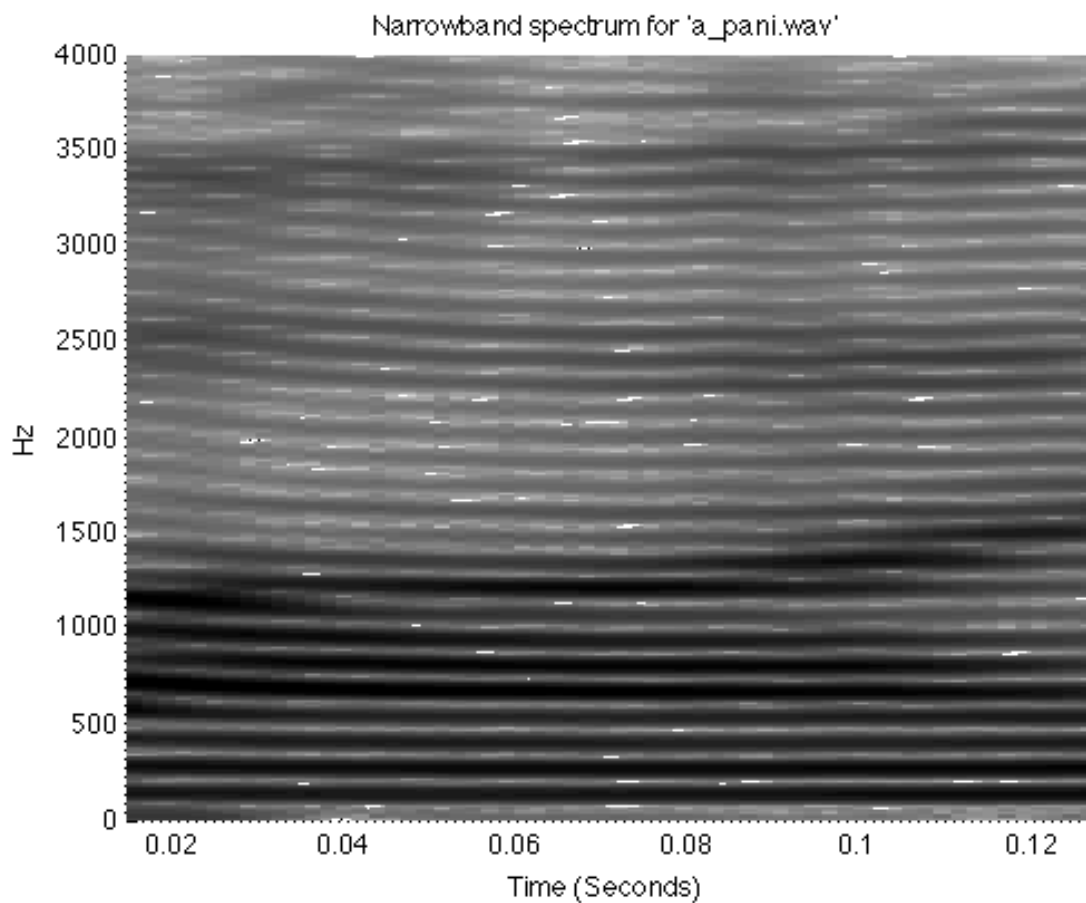
EE 679 Computing Assignment 3

Name: Swrangsar Basumatary Roll: 09d07040

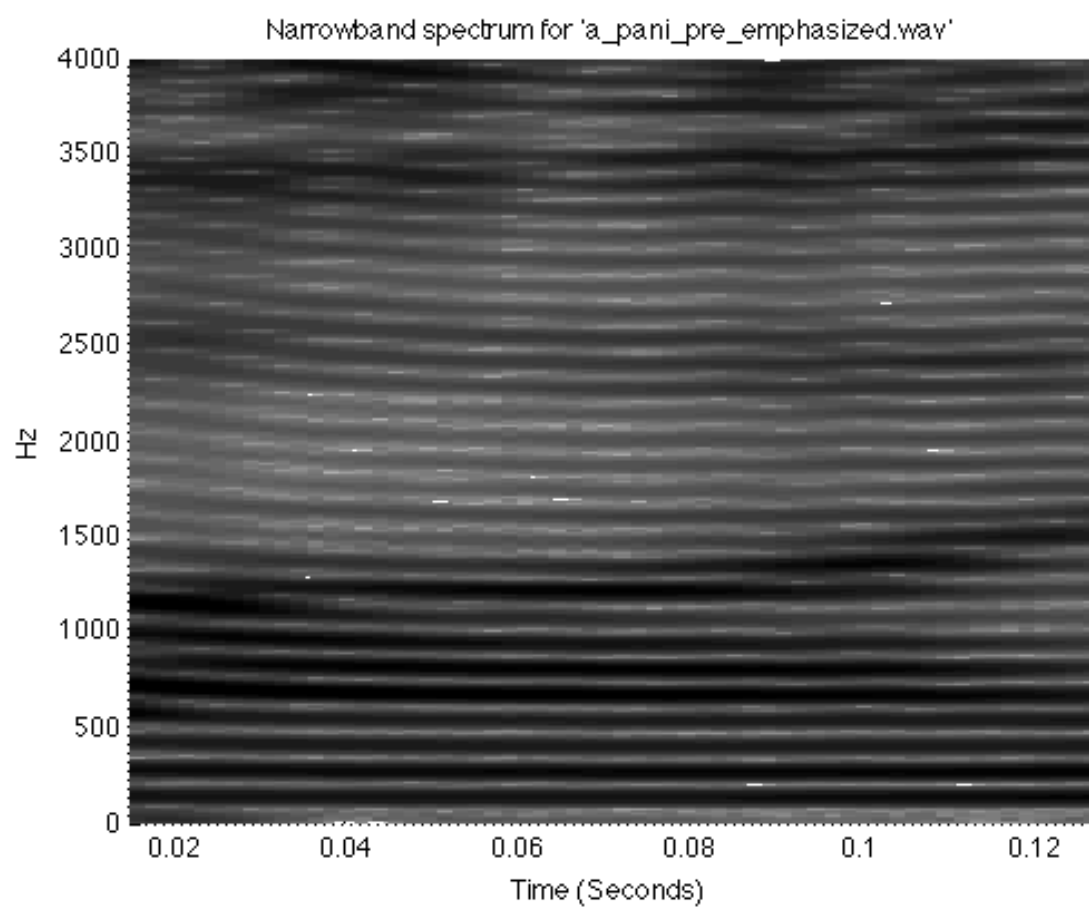
Question 1

Finding the narrowband spectrum of four syllables:

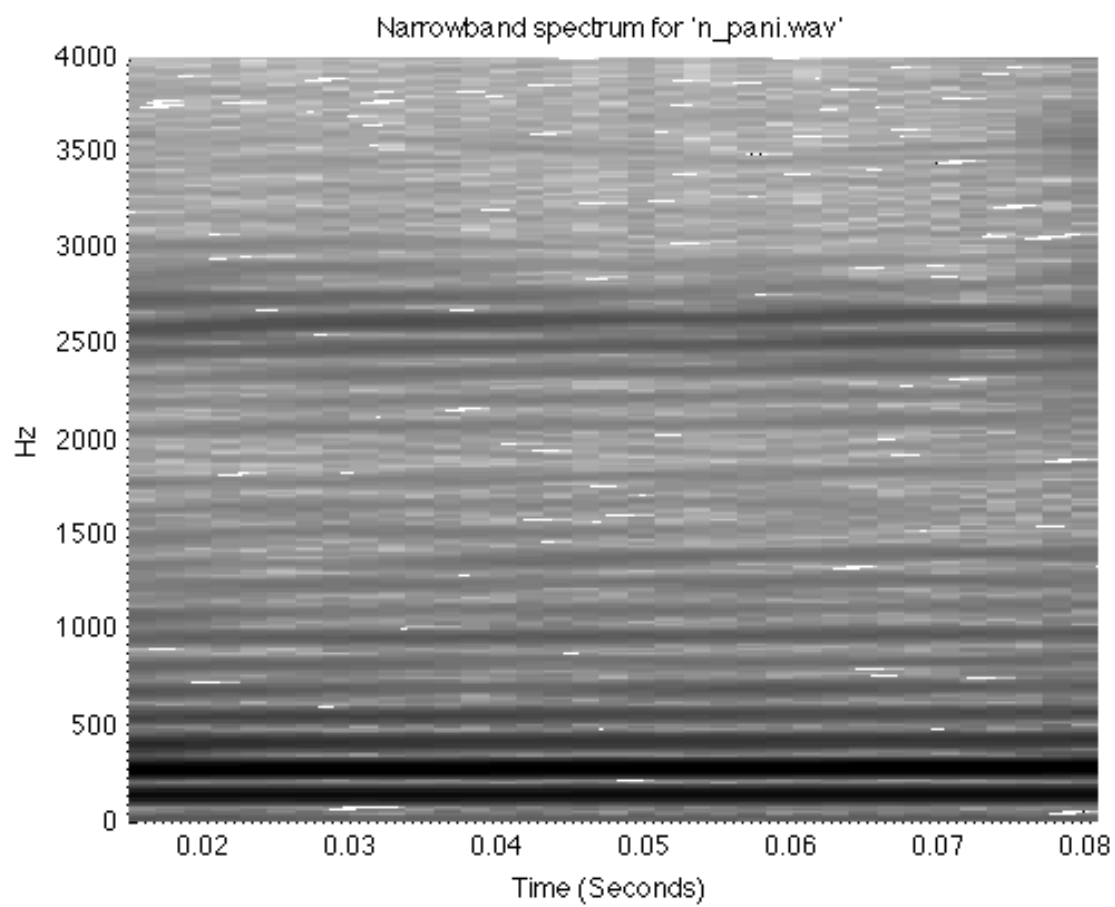
a) /a/ in 'pani'



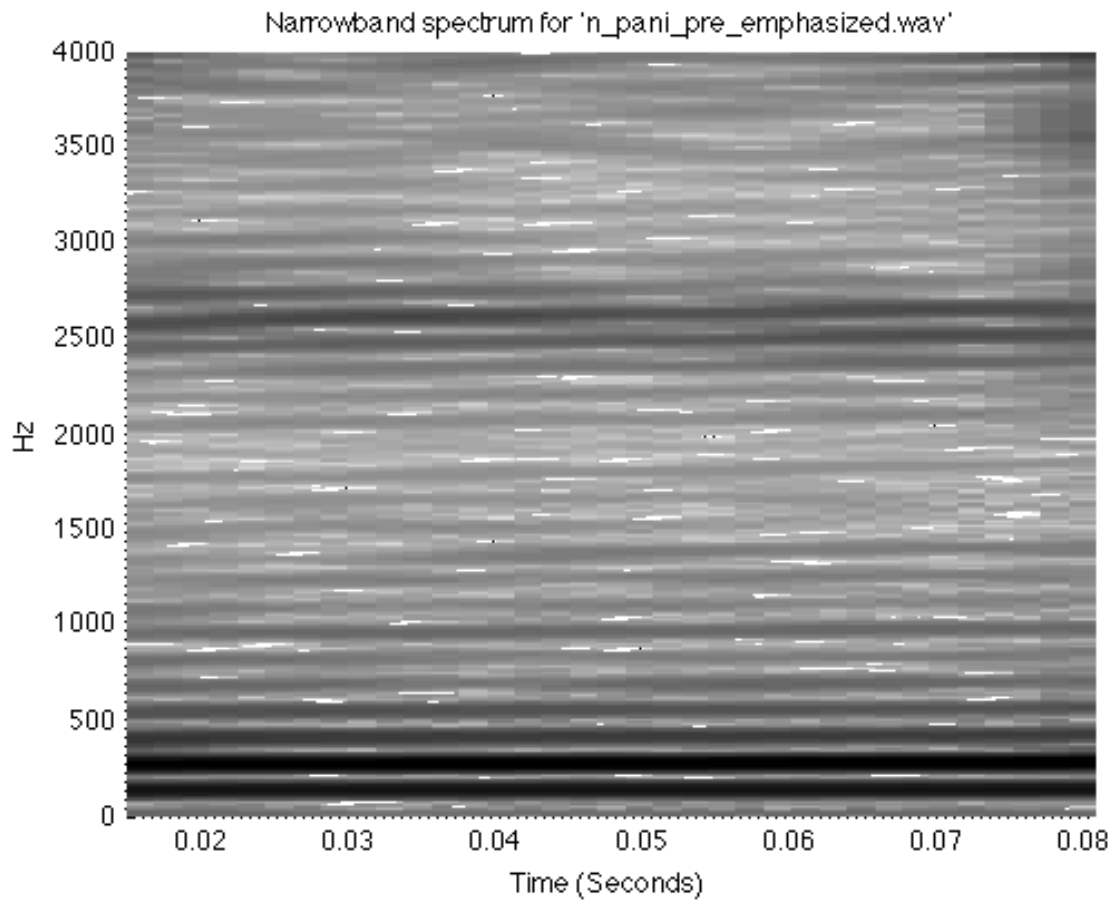
b) /a/ in 'pani' pre-emphasized



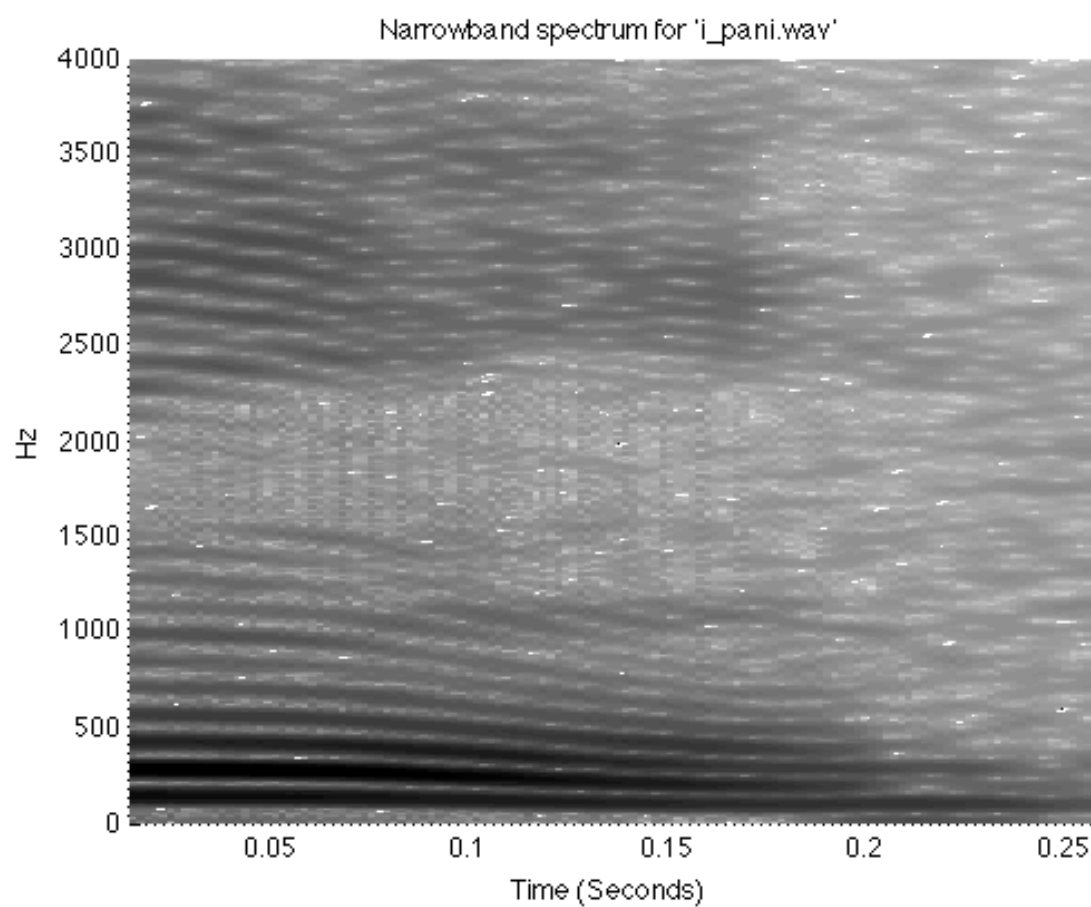
c) /n/ in 'pani'



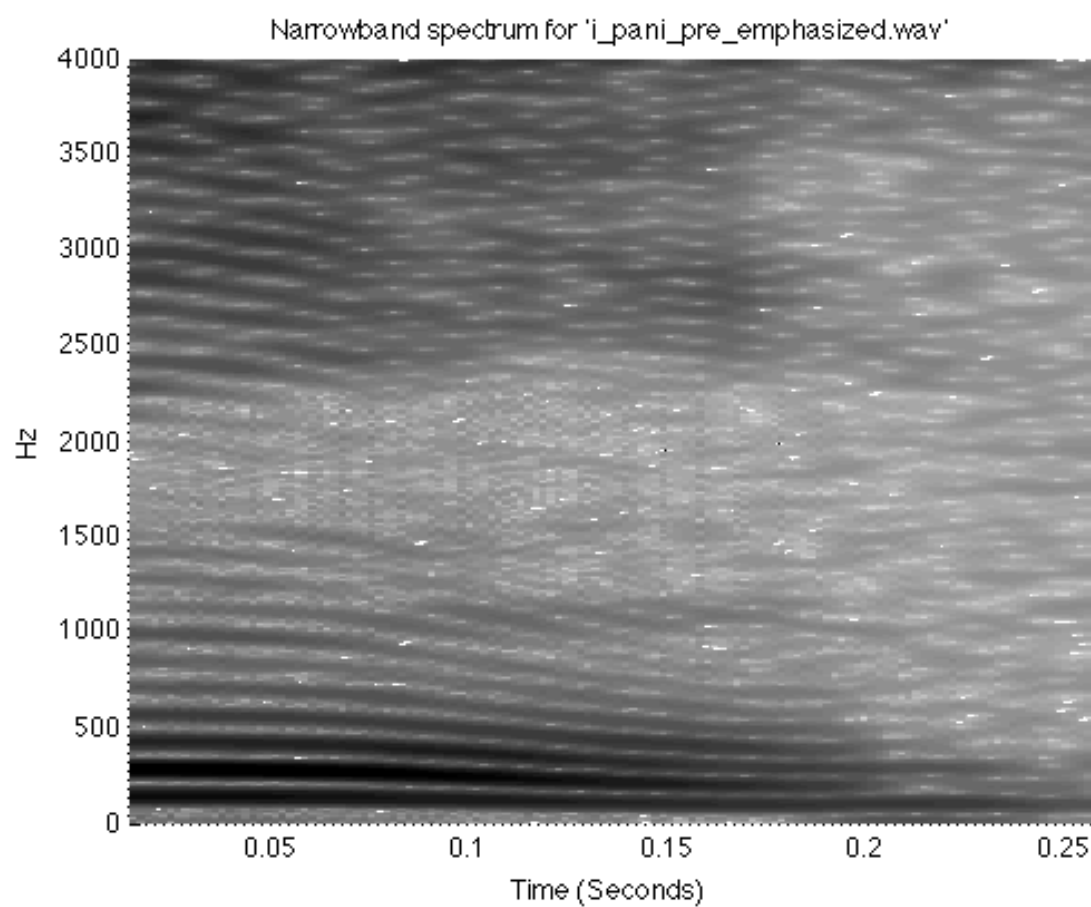
d) /n/ in 'pani' pre-emphasized



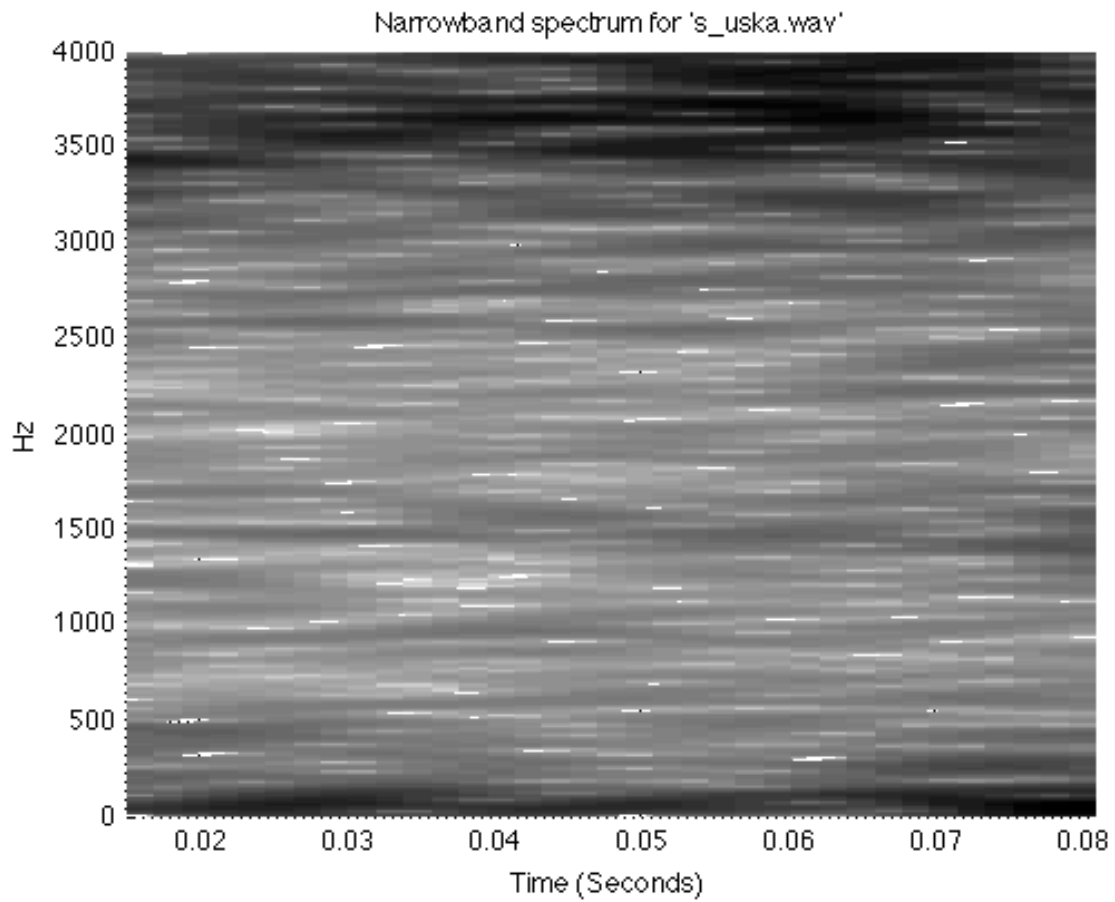
e) // in 'pani'



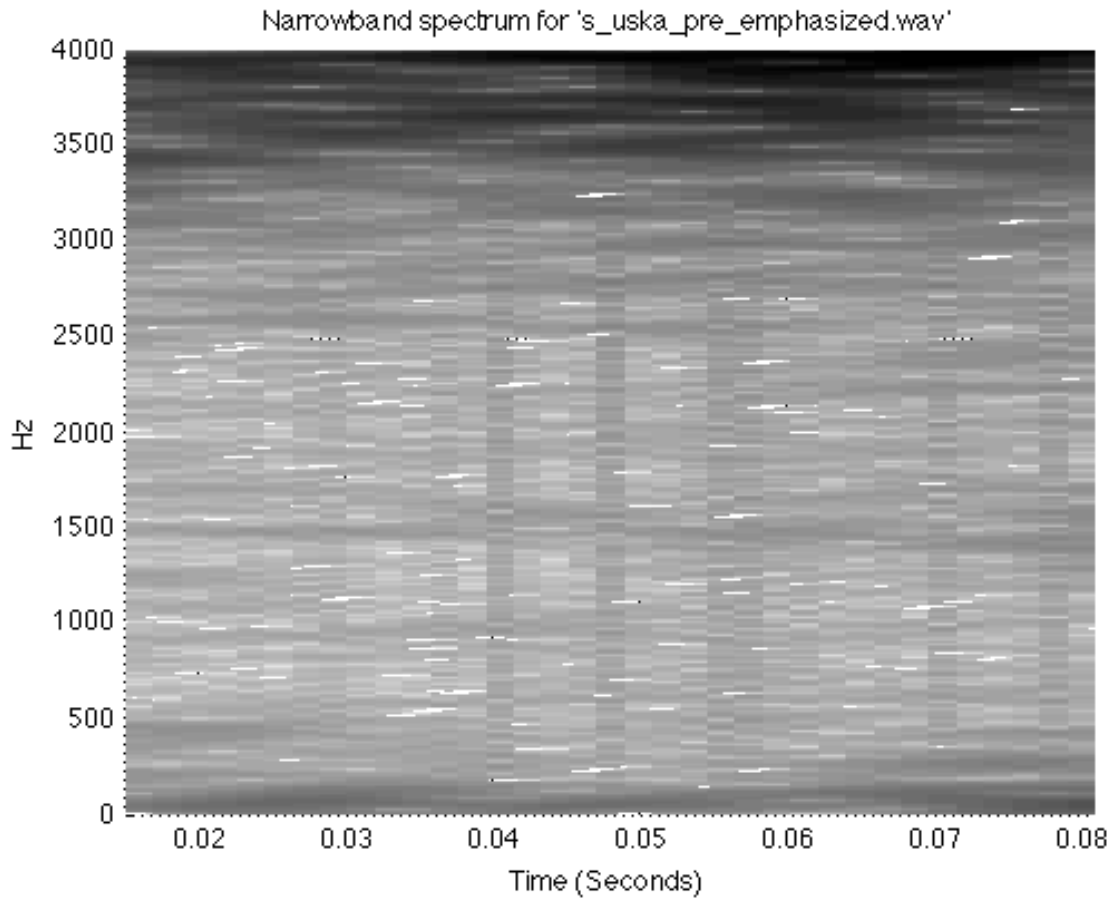
f) // in 'pani' pre-emphasized



g) /s/ in 'uska'



h) /s/ in 'uska' pre-emphasized



Script for finding the narrowband spectrum

```
close all; clear all;

figure(100); clf;
printNarrowbandSpectrum('a_pani.wav');
[y, fs] = preEmphasize('a_pani.wav');
wavwrite(y, fs, 32, 'a_pani_pre_emphasized.wav');
figure(200); clf;
printNarrowbandSpectrum('a_pani_pre_emphasized.wav');

figure(300); clf;
printNarrowbandSpectrum('n_pani.wav');
[y, fs] = preEmphasize('n_pani.wav');
wavwrite(y, fs, 32, 'n_pani_pre_emphasized.wav');
figure(400); clf;
printNarrowbandSpectrum('n_pani_pre_emphasized.wav');
```



```

figure(500); clf;
printNarrowbandSpectrum('i_pani.wav');
[y, fs] = preEmphasize('i_pani.wav');
wavwrite(y, fs, 32, 'i_pani_pre_emphasized.wav');
figure(600); clf;
printNarrowbandSpectrum('i_pani_pre_emphasized.wav');

figure(700); clf;
printNarrowbandSpectrum('s_uska.wav');
[y, fs] = preEmphasize('s_uska.wav');
wavwrite(y, fs, 32, 's_uska_pre_emphasized.wav');
figure(800); clf;
printNarrowbandSpectrum('s_uska_pre_emphasized.wav');

```

Code for the functions used in finding the narrowband spectrum

```

function [signal, fs] = preEmphasize(inputFile)

[y, fs] = wavread(inputFile);
siz = size(y);
length = siz(1);

for k = 1:length
    if k > 1
        y(k) = y(k) - (0.97*y(k-1));
    end
end

signal = y;
end

function printNarrowbandSpectrum(fileInput)

[y, fs] = wavread(fileInput);

colormap('gray');
map = colormap;
imap = flipud(map);
M = round(0.030*fs); % 30 ms window
N = 2^nextpow2(4*M); % with zero padding
w = 0.54 - 0.46 * cos(2*pi*[0:M-1]/(M-1)); % w = hamming(M);
[~,F,T,P] = spectrogram(y, w, (M*(15/16)), N, fs);

```

```
surf(T,F,10*log10(P),'edgecolor','none');  
title(['Narrowband spectrum for ', fileInput, ''],  
      'interpreter', 'none');  
axis tight;  
colormap(imap);  
view(0,90);  
xlabel('Time (Seconds)'); ylabel('Hz');  
  
end
```