TFW-HW2

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(ii)Code:

main.m

clc

clear all

close all

[a1, fs]= wavread('Chord.wav');

x= a1(:,1).'; %extract the first channel

dtau= 1/fs; dt= 0.01; df= 1;

S= round(dt/dtau);

tau= 0:dtau:max(x);

t= 0:dt:max(tau);

f= 80:df:1000;

sgm= 200;

for a=0:10 %run 10 times

tic % start time

y= Gabor (x, tau, t, f, sgm);

toc % end time

end

figure;

C= 10000;

image(t,f,abs(y)\*C);

colormap(gray(256));

set(gca,'Ydir','normal');

set(gca,'Fontsize', 12);

title('Scaled Gabor of x(t)','Fontsize', 12);

xlabel('Time (Sec)','Fontsize', 12) ;

ylabel('Frequency (Hz)','Fontsize', 12);

Gabor:

function y=Gabor(x,tau,t,f,sgm)%by R04943133

dtau=tau(2)-tau(1);

dt=t(2)-t(1);

df=f(2)-f(1);

S= round(dt/dtau);

N= round(1/dtau/df);

B= 1.9143;

Q= floor(B/dtau/sqrt(sgm));

n= round(t/dtau/S); % t to n

n1= n-round(min(tau)/dtau/S) + 1;

ln= length(n);

m= round(f/df)'; % f to m

lm= length(m); % number of points on f-axis

m0= mod(m, N) + 1;

x1= [zeros(Q, 1);x.'; zeros(Q, 1)];

gs= exp(-sgm\*pi\*dtau^2\*[Q:-1:-Q]'.^2) \* dtau;

y= zeros(lm, ln);

%±`¼Æ¦bloop¥~°µ¥H´£°ª®Ä²v

m1= 1j\*2\*pi/N\*m;

Q2= 2\*Q;

sgm1= sgm^(0.25);

for a=1:ln

x1a= fft(x1(S\*n1(a):Q2+S\*n1(a)).\*gs, N);

y(1:lm, a)= sgm1\*x1a(m0).\*exp(m1\*(Q-S\*n(a)));

end

(iii)



(v)tau = 200

(vi)

Elapsed time is 0.051486 seconds.

Elapsed time is 0.051191 seconds.

Elapsed time is 0.050510 seconds.

Elapsed time is 0.050803 seconds.

Elapsed time is 0.050601 seconds.

Elapsed time is 0.051019 seconds.

Elapsed time is 0.049483 seconds.

Elapsed time is 0.048905 seconds.

Elapsed time is 0.050563 seconds.

Elapsed time is 0.051179 seconds.