TFW-HW3

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(ii)Code:

main.m

clc

clear all

close all

del\_t = 0.0125; del\_f = 0.05;

t = -9:del\_t:9; f = -4:del\_f:4;

x = exp(j\*t.^2/10-j\*3\*t).\*((t>=-9)&(t<=1))+exp(j\*t.^2/2+j\*6\*t).\*exp(-(t-4).^2/10);

tic

y=wdf (x,t,f);

toc

figure;

C= 10000;

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

colormap(gray(256));

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

set(gca,'Fontsize', 12);

title('Wigner distribution function of x(t)','Fontsize', 12);

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

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

WDF:

function y = wdf(x,t,f)%by R04943133

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

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

N = fix(1/(2\*dt\*df));

n0 = t(1);

m0 = f(1);

n1 = length(x);

m = fix(f/df);

n = fix(t/df);

%DFT method

for i = 1:n1

Q = min(n1-i,i-1);

C = x(i-Q:i+Q).\*conj(x(i+Q:-1:i-Q));

X = fft(C,N);

y(:,i)=2\*dt\*exp(j\*2\*pi\*m\*Q/N).\*X(mod(m,N)+1);

end

(iii)



(iv)

Elapsed time is 0.312857 seconds.

Elapsed time is 0.060880 seconds.