电子科技大学 格拉斯哥 学院

___Glasgow____ **of UESTC**

标 准 实 验 报 告

Lab Report

（实验）课程名称: 信号与系统

(LAB) Course Name: SIGNAL AND SYSTEM

电子科技大学教务处制表

Glasgow College，UESTC

Lab Report

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指导教师 **Instructor： SHI Chuang**

实验地点 **Location： Main Building A1-305**

实验时间 **Date：2018/11/26**

一、 实验室名称 **Laboratory name：virtual machine laboratory**

二、 实验项目名称 **Project name：SIGNAL AND SYSTEM LAB**

三、 实验学时 **Lab hours：4×4=16**

四、 实验原理 **Theoretical background：**

The concept of numerical approximation to the continuous-time Fourier series with a very small tau(τ) was introduced. Moreover, properties of continuous-time Fourier series are also needed.

五、 实验目的 **Objective：**

Review the fft and ifft function for discrete-time Fourier series.

shiftfft was introduced for continuous-time Fourier series.

Sampling is needed in the process of the given audio

六、 实验内容 **Description：**

continuous-time Fourier series and discrete-time Fourier series are connected with the shiftfft function. Besides, sampling, load, sound are needed in the audio modulation.

七、 实验器材（设备、元器件）**Required instruments：**

A computer with the MATLAB software

八、 实验步骤 **Procedures：**

Get familiar with the new knowledge in the cha 7&8, which is very important in the 4.3 series.

Review the knowledge about discrete-time Fourier series, most importantly, the fft and ifft function in the 3.1.

Answer the required questions with MATLAB ways, which means state or present the known condition in MATLAB ways and then calculated by the MATLAB.

九、 实验数据及结果分析 **Analysis of Lab data & result：**

4.2 a) Xjw=1./(2+1i*w)+1./(2-1i*w);

4.2 b)

```
tau=0.01;
T=10;
t=[0:tau:T-tau];
```

N=T/tau;

xt=exp(-2*abs(t));

yt=exp(-2*abs(t-5));

Y=tau*fft(yt);

4.2 c)

Y=fftshift(tau*fft(yt));

4.2 d)

w=-(pi/tau)+(0:N-1)*(2*pi/(N*tau));

4.2 e)

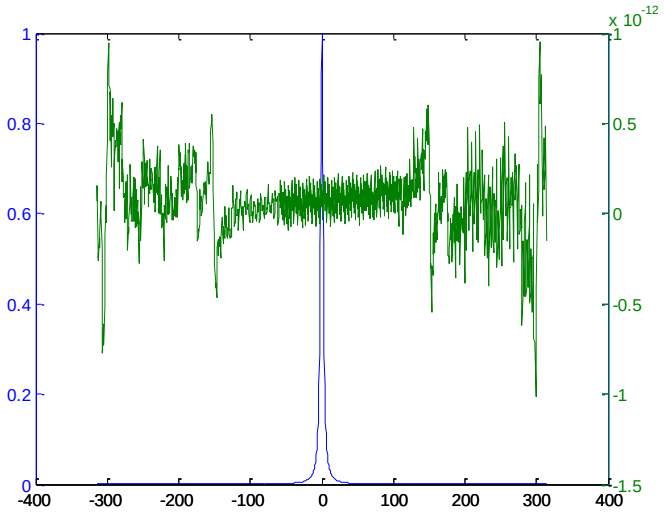
X=Y./exp(1i*5*w);

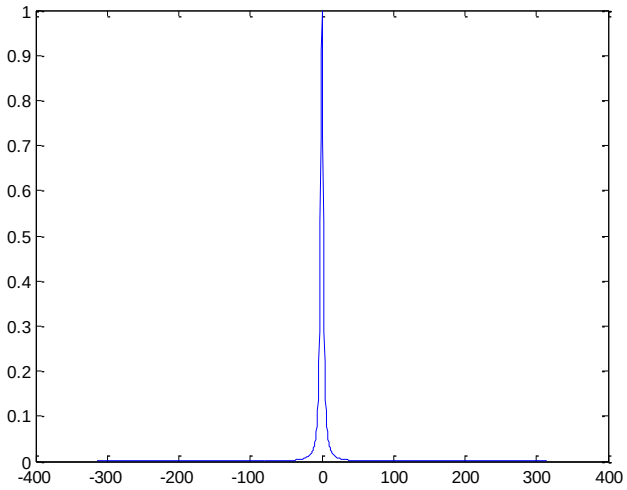
4.2 f)

amplitude=abs(X);

ang=angle(X);

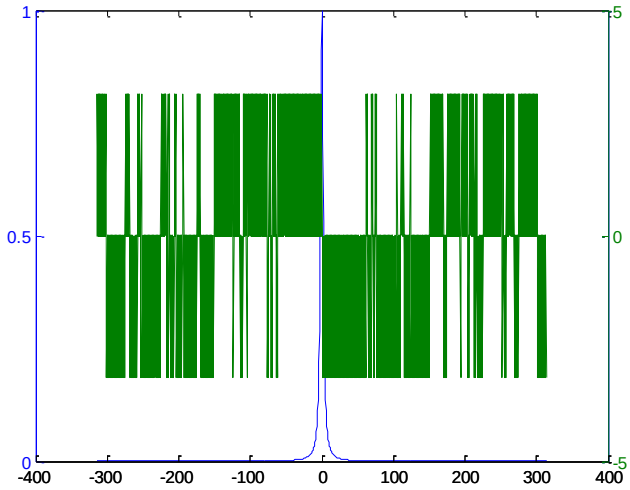
plotyy(w,amplitude,w,ang)





4.2 g)

```
amplitudey=abs(Y);
angy=angle(Y);
plotyy(w,amplitudey,w,angy);
```

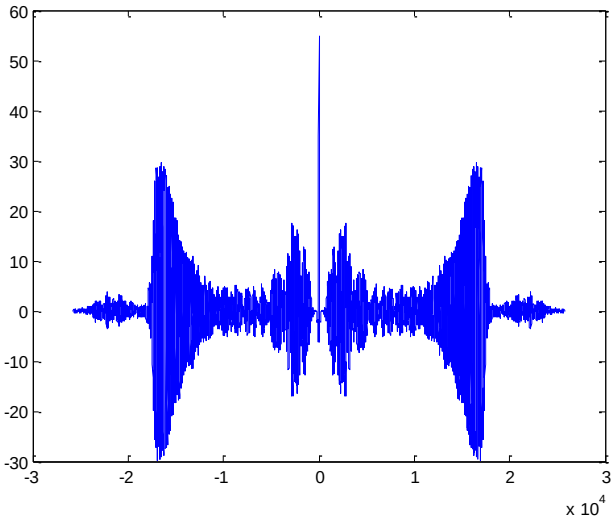


4.3 a)

```
load splat;

  y= y(1:8192);
  N=8192;
fs=8192;
sound(y,fs);

Y=fftshift(fft(y));
w=[-pi:2*pi/N:pi-pi/N]*fs;
plot(w,Y);
```



4.3 b)

```
Y1=conj(Y);
y1i=ifft(fftshift(Y1));
y1i=real(y1i);
sound(y1i,fs);
```

4.3 c)

```
yt=real(y);
Y=fftshift(fft(yt));
Y2=abs(Y);
Y3ang=angle(Y);
Y3=exp(1i*Y3ang);
```

4.3 d)

```
Y2=abs(Y);
Y2n=ifft(fftshift(Y2));
Y2n=real(Y2n);
sound(Y2n,fs);
```

4.3 e)

```
Y3=Y*0+1;
```

```
plot(w,Y3);
Y3n=ifft(fftshift(Y3));
Y3n=real(Y3n);
sound(Y3n,fs);
```

4.3 f)
Amplitude counts more.

十、 实验结论 **Lab conclusion：**

Results are shown above.

十一、总结及心得体会 **Summary and comments：**

Theoretical knowledge of chapter 7&8 provide us a new way of thinking, the equation of some signal is not always obvious to people, so sampling or modulation are needed in order to express this signal uniquely. Then the process of modulation can be done by the MATLAB.

十二、对本实验过程及方法、手段的改进建议 **Suggestion for this lab：**

Theoretical knowledge should be consolidated and deepened in the leisure time, otherwise I ll be trapped in that again.

报告评分 **Score：**

指导教师签字 **Instructor：**