Matlab 6^{th} Homework

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1 Limit

1.1 Plot Signal Curves

$$(2-e^{(}-t))u(t)$$
$$t[u(t)-u(t-1)]$$
$$[1+cos(\pi t)][u(t)-u(t-2)]$$
$$u(cos(t))$$

1.2 Analysis

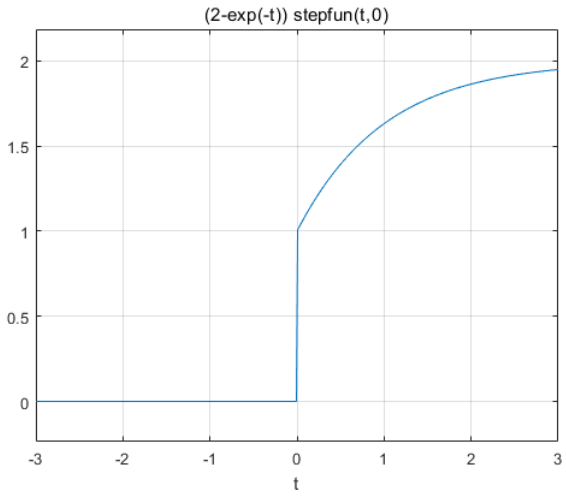
To generate step function u(t),use **stepfun()** or **heaviside()**.

1.3 Codes and Result

Question 1

```
1    ezplot('(2-exp(-t)).*stepfun(t,0)',[-3,3]);
```

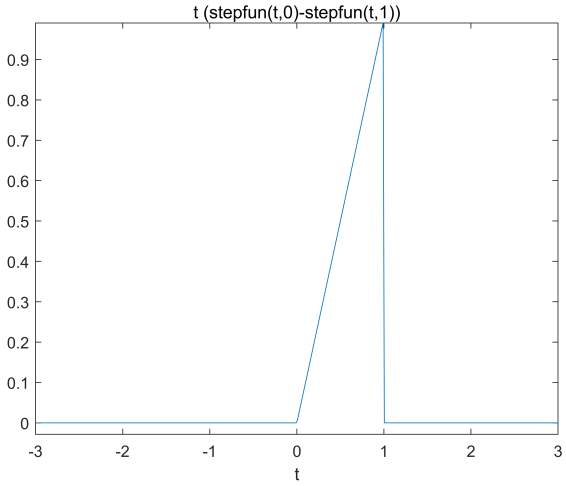
Result



Question 2

```
ezplot('t.*(stepfun(t,0)-stepfun(t,1))',[-3,3]);
```

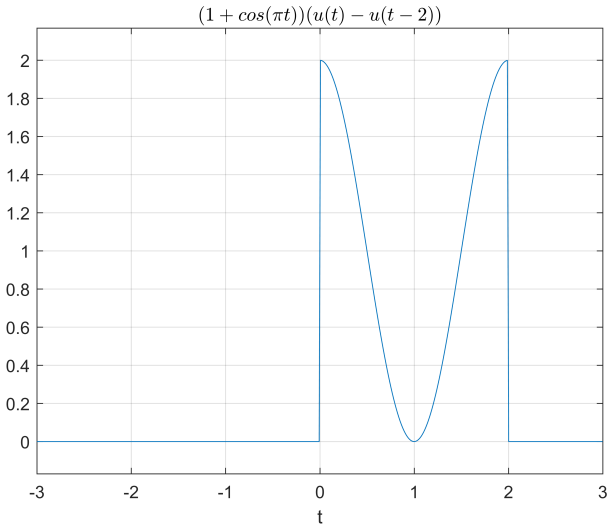
Result



Question 3

```
ezplot('(stepfun(t,0)-stepfun(t,2)).*(1+cos(pi*t))',[-3,3]);
grid on;
title('(1+cos(\pi t))(u(t)-u(t-2))','Interpreter','Latex');
```

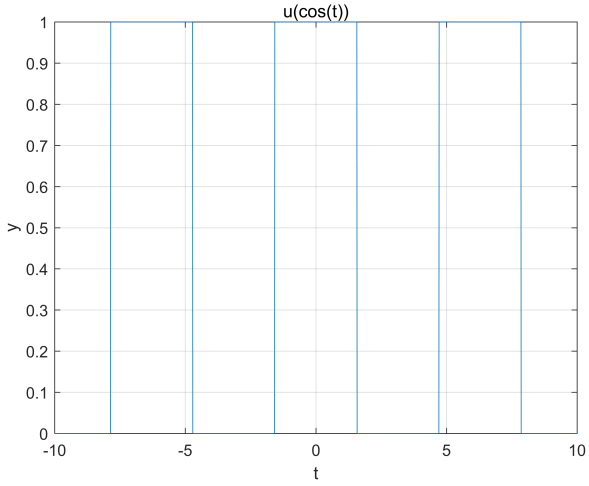
Result



Question 4

```
t=-10:0.01:10;
y=heaviside(cos(t));
plot(t,y)
grid on;
hold on;
title('u(cos(t))');
xlabel('t');
ylabel('y')
```

Result



2 complex Plot

2.1 Description

Draw the real, imaginary, mold, and spoke angle of the following complex signals.

$$f(t) = 2 + e^{j\frac{\pi}{4}t} + e^{j\frac{\pi}{2}t}$$

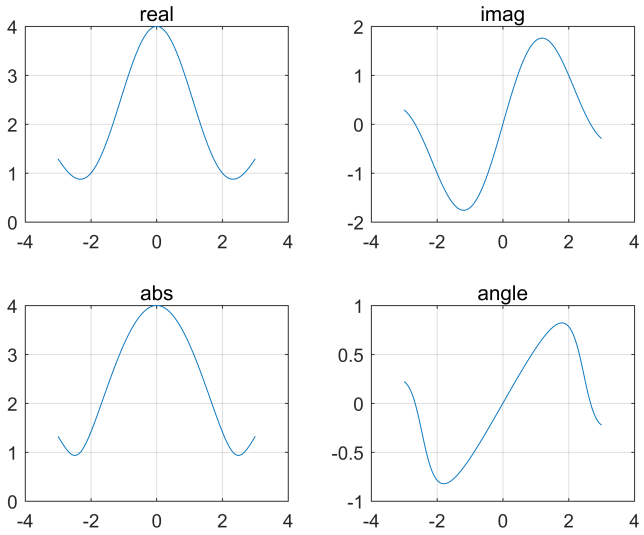
2.2 Anaylsis

use function **real(),imag(),angle(),abs()**.

2.3 Code and Result

```
t=-3:0.01:3;
f=2+exp(j*pi/4*t)+exp(j*pi/2*t);
subplot(2,2,1);
plot(t,real(f));title('real');grid on;
subplot(2,2,2);
plot(t,imag(f));title('imag');grid on;
subplot(2,2,3);
plot(t,abs(f));title('abs');grid on;
subplot(2,2,4);
plot(t,angle(f));title('angle');grid on;
```

Result



3 Rectangular pulse signal

3.1 Description

Produce a cycle rectangular pulse signal with a amplitude of 1, a period of 1, and a duty cycle of 0.5

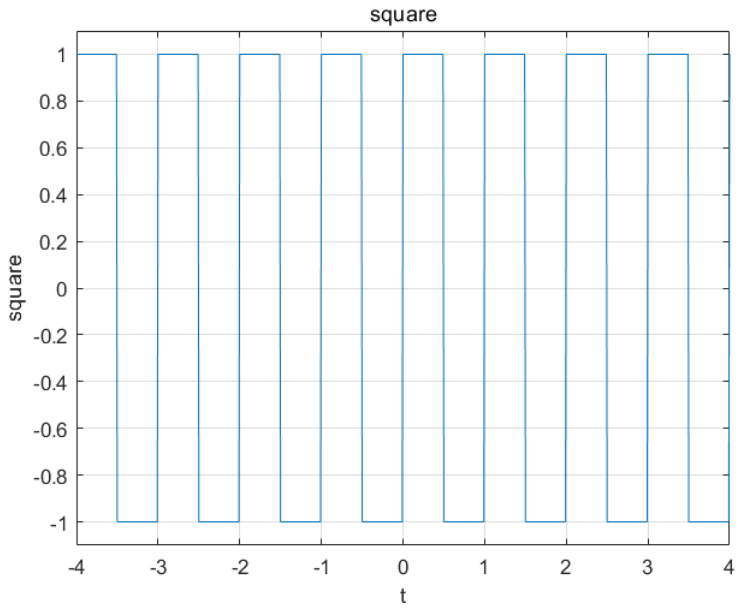
3.2 Anaylsis

Use function **square(2*pi*T,duty)**

3.3 Code and Result

```
t=-4:0.01:4;
y=square(2*pi*t,50);
plot(t,y);
hold on;
grid on;
title('square');
xlabel('t');
ylabel('square');
axis([-4,4,-1.1,1.1]);
```

Result



4 Plot signal f

4.1 Description

Plot $f(t) = \frac{sin\pi t}{t}$ and f(2t) f(1-0.5t).

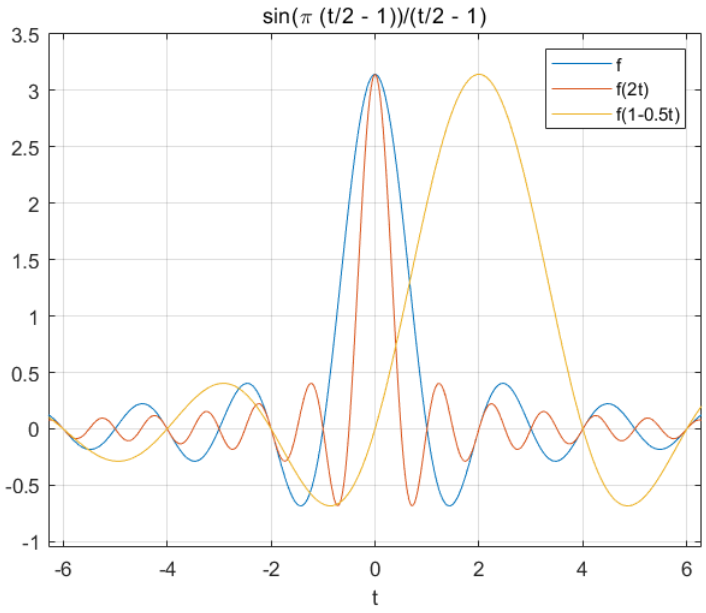
4.2 Anaylsis

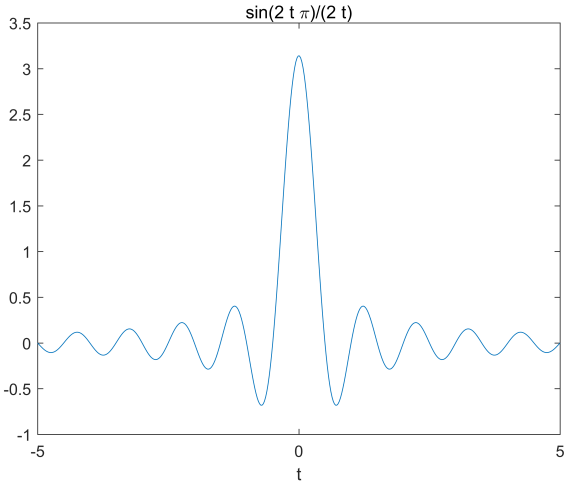
Use **ezplot(),sinc(T*2*π)**.

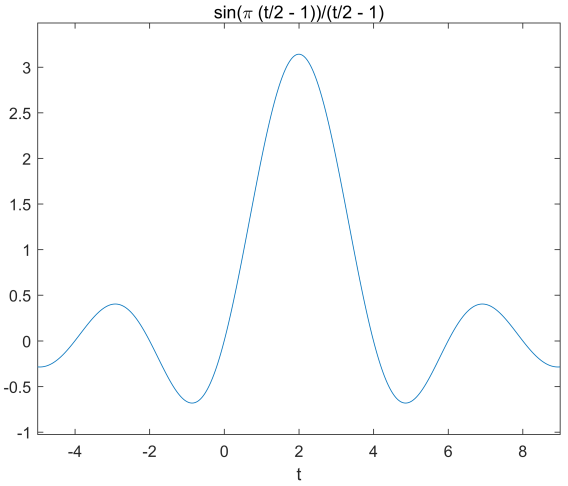
4.3 Code and Result

```
syms t
f=sinc(t)*pi;
ezplot(f);
hold on;
ezplot(subs(f,t,2*t));
ezplot(subs(f,t,1-0.5*t));
grid on;
legend('f','f(2t)','f(1-0.5t)')
```

Result




sin(2 t π)/(2 t)
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-5
0
5
t


sin(π (t/2 - 1))/(t/2 - 1)
3
2.5
2
1.5
1
0.5
0
-0.5
-1
-4
-2
0
2
4
6
8
t