정보통신 수학 및 실습
Lab assignment

학번 :	2016110056	2012112130
이름 :	박승원	노희승
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dongguk UNIVERSITY

Chapter 4. Lab Assignment

1. Let c1=4+5j and c2=1-6j. Answer the following questions using MATLAB.

a) **a = c1 - c2**

b) **b = c1*c2**

c) **c = c1/c2**

d) **The magnitude of c1**

e) **The phase of c2**

```
>> c1 = 4 + 5i
c1 =  4 + 5i
>> c2 = 1−6j
c2 =  1 − 6i
>> a = c1 − c2
a =   3 + 11i
>> b = c1 * c2
b =  34 − 19i
>> c = c1 / c2
c = −0.70270 + 0.78378 i
>> abs(c1)
ans =  6.4031
>> angle(c2)
ans = −1.4056
```

2. Let $z1 = 3(\cos\frac{\pi}{3} + j\sin\frac{\pi}{3})$ $z2 = 5(\cos\frac{\pi}{4} + j\sin\frac{\pi}{4})$, answer the following questions:

a) **z1*z2.**

b) **z2/z1**

c) $(z1)^3 + 2 * (z1)^2 + 5 * z1 + 1$

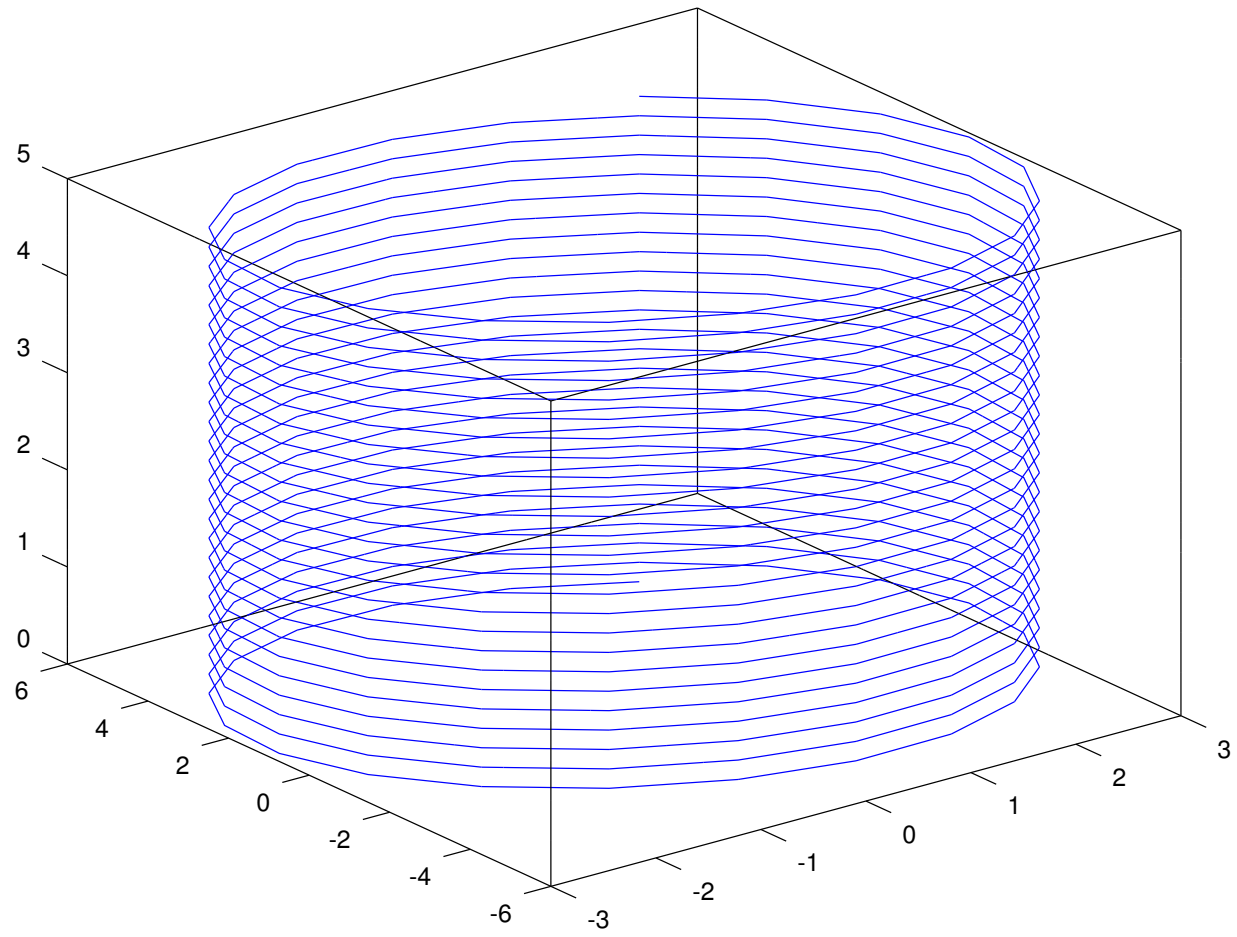
```
>> z1 = 3*(cos(pi/3) + j*sin(pi/3))
z1 =  1.5000 + 2.5981 i
>> z2 = 5*(cos(pi/4) + j*sin(pi/4))
z2 =  3.5355 + 3.5355 i
>> z1*z2
ans =  −3.8823 + 14.4889 i
>> z2/z1
ans =  1.60988 − 0.43137 i
```

```
>> z1^3+2*z1^2+5*z1+1
ans = −27.500 + 28.579 i
```

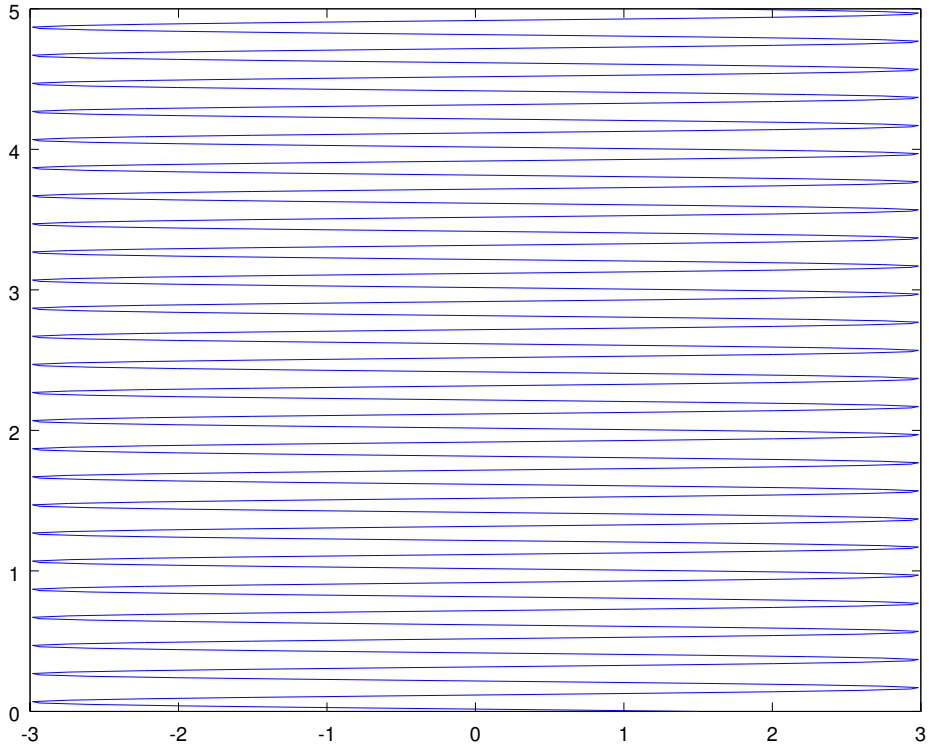
```
>> z1 = 3*e^( i*pi/4)
z1 =  2.1213 + 2.1213 i
>> z1 = 3*e^( i*pi/3)
z1 =  1.5000 + 2.5981 i
>> z2 = 5*e^( I*pi/4)
z2 =  3.5355 + 3.5355 i
>> z1*z2
ans =  −3.8823 + 14.4889 i
>> z2/z1
ans =  1.60988 − 0.43137 i
>> z1^3+2*z1^2+5*z1+1
ans = −27.500 + 28.579 i
```

3. Let w = 10*pi, t = [0:0.01:5]. Also let p1 = 3exp(i*(wt+pi/3)), p2 = 5*exp(i*wt+pi/4)). Answer the following questions.

a) Plot p1 using x=real(p1), y=imag(p1), z=t, and plot3(x,y,z).

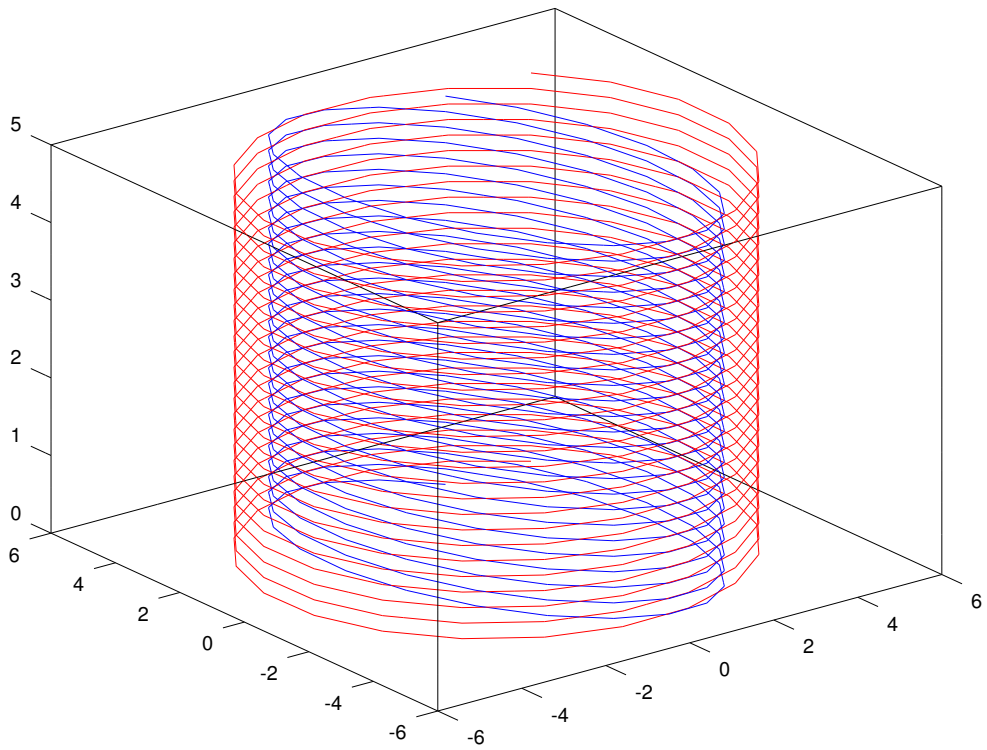


b) Find the frequency of p1 by rotating the figure drawn in (a) and see the graph on either x axis or y axis.



세로축(시간)의 1당 약 5번의 주기가 반복된다.

c) Plot p2 using the same way as (a). Overlay p2 on p1 using hold on command and use red ink using plot3(x, y, z, 'r').



d) Plot p3=p1+p2. Overlay p1, p2, p3 on the same page using hold on command and use amber ink using plot3(x, y, z, 'y')..