MATH320 HOMEWORK1

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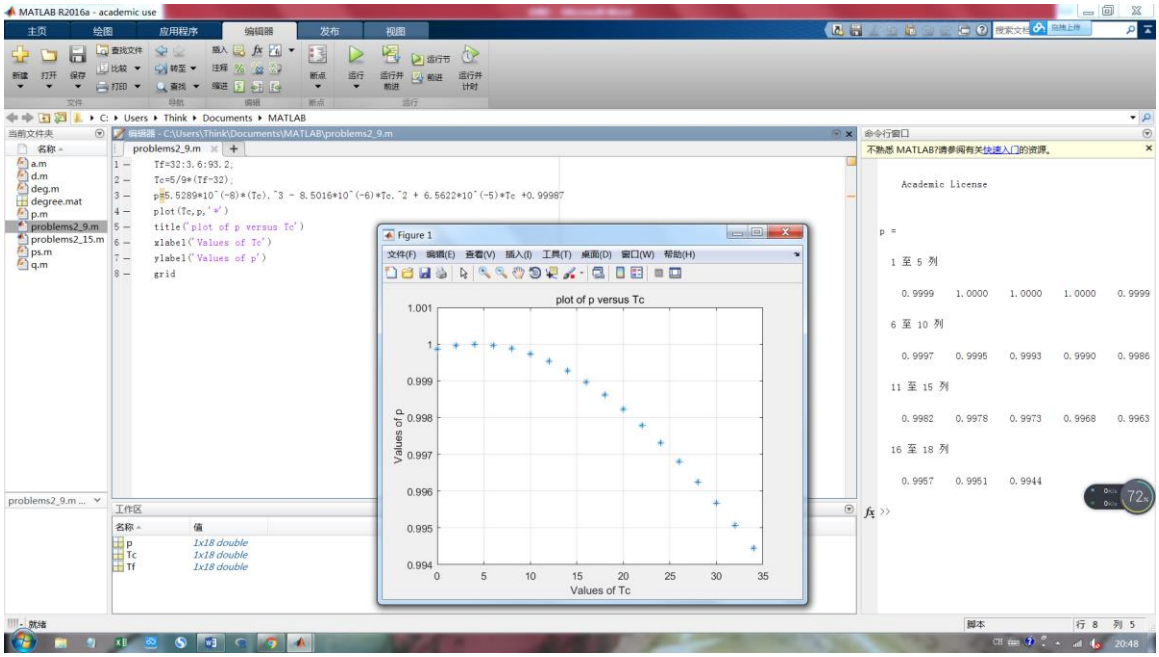
Problem2_9

Overall:



Code:

```
Tf=32:3.6:93.2;
Tc=5/9*(Tf-32);
p=5.5289*10^(-8)*(Tc).^3 - 8.5016*10^(-6)*Tc.^2 + 6.5622*10^(-
5)*Tc +0.99987
plot(Tc,p,'*')
title('plot of p versus Tc')
xlabel('Values of Tc')
ylabel('Values of p')
grid
```

Output:

p =

col1-col5

0.9999 1.0000 1.0000 1.0000 0.9999

col6- col10

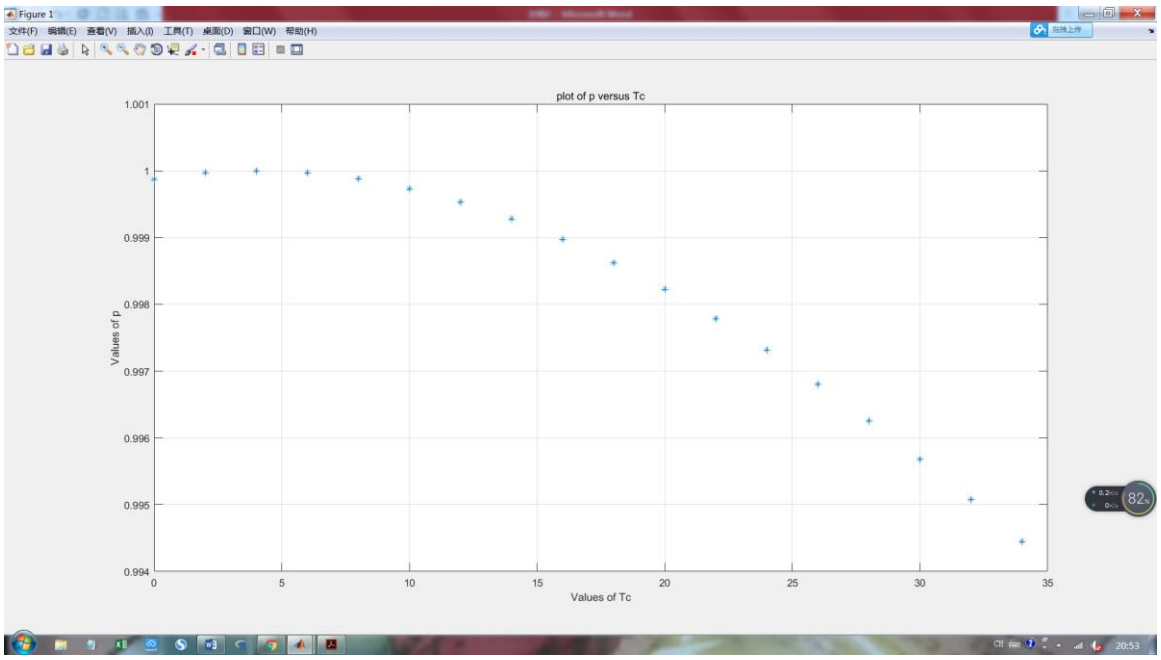
0.9997 0.9995 0.9993 0.9990 0.9986

col11-col15

0.9982 0.9978 0.9973 0.9968 0.9963

col16-col18

0.9957 0.9951 0.9944

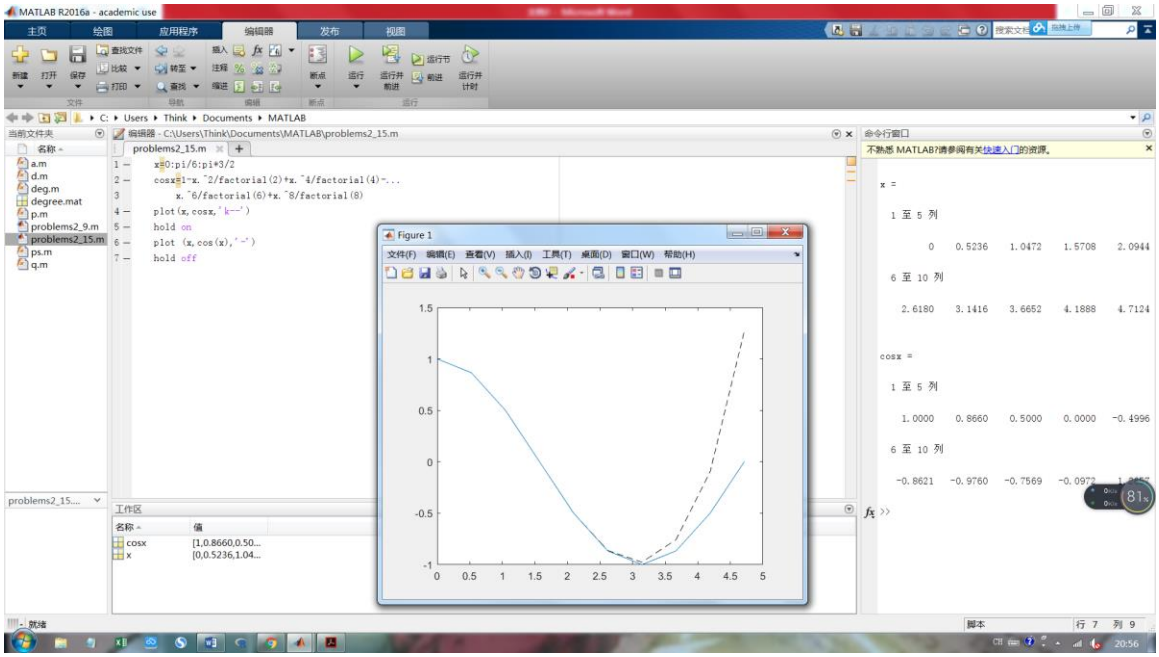


Comments:

```
Tf=32:3.6:93.2;%Tf=temperature(° F),increments of 3.6° F
Tc=5/9*(Tf-32);% Tc=temperature(° C),Tc=5/9*(Tf-32)
p=5.5289*10^(-8)*(Tc).^3 - 8.5016*10^(-6)*Tc.^2 + 6.5622*10^(-
5)*Tc +0.99987  %p equals to ρ, which is density(g/cm^3)
plot(Tc,p,'*')  %x-axis:Tc, y-axis:p
title('plot of p versus Tc') % customize the graph with commands
xlabel('Values of Tc')
ylabel('Values of p')
grid
```

Problem2_15

Overall:



Code:

```
x=0:pi/6:pi*3/2
cosx=1-x.^2/factorial(2)+x.^4/factorial(4)-...
    x.^6/factorial(6)+x.^8/factorial(8)
plot(x,cosx,'k--')
hold on
plot (x,cos(x),'-')
hold off
```

Output:

x =

col1-col5

0 0.5236 1.0472 1.5708 2.0944

col6-col 10

2.6180 3.1416 3.6652 4.1888 4.7124

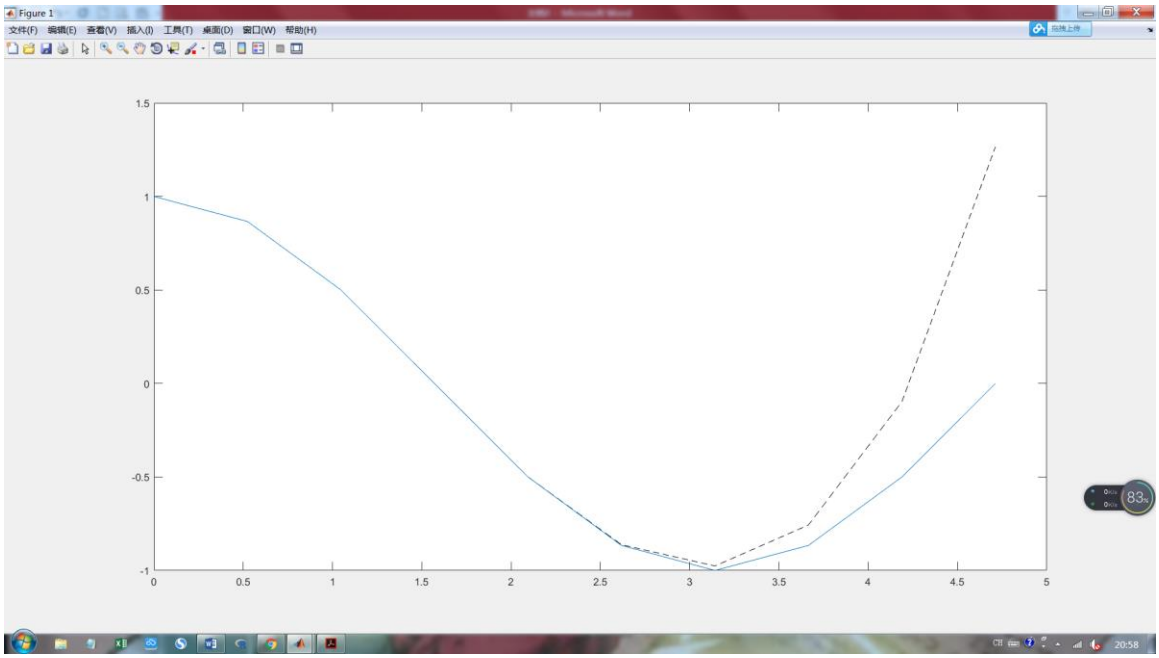
cosx =

col1-col 5

1.0000 0.8660 0.5000 0.0000 -0.4996

col6-col10

-0.8621 -0.9760 -0.7569 -0.0972 1.2657

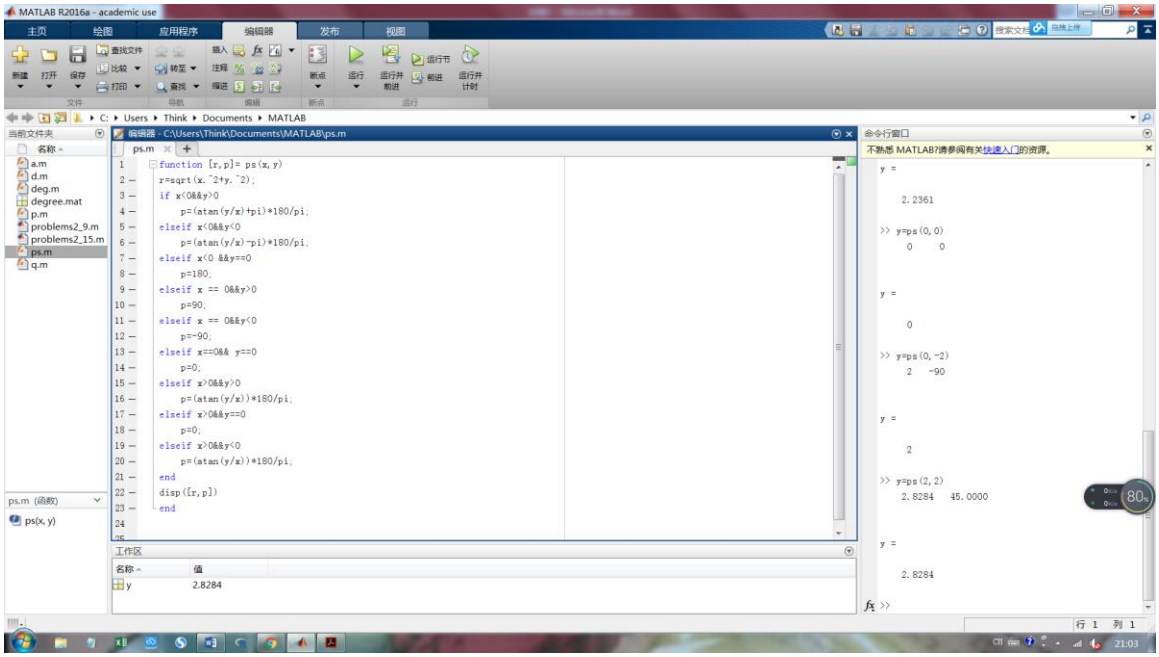


Comments:

```
x=0:pi/6:pi*3/2  %the range of the abscissa from x=0 to 3pi/2
cosx=1-x.^2/factorial(2)+x.^4/factorial(4)-...
    x.^6/factorial(6)+x.^8/factorial(8)  %the Maclaurin series
expansion up to and including the term x^8/8!
plot(x,cosx,'k--') %x-axis:x, y-axis:cosx,k:black
hold on
plot (x,cos(x),'-')  %cosx represents a plot of the series
expansion, while cos(x) represents a plot of the cosine
hold off
```

Problem3_6(ps.m)

Overall:



Code:

```
function [r,p]= ps(x,y)
r=sqrt(x.^2+y.^2);
if x<0&&y>0
    p=(atan(y/x)+pi)*180/pi;
elseif x<0&&y<0
    p=(atan(y/x)-pi)*180/pi;
elseif x<0 &&y==0
    p=180;
elseif x == 0&&y>0
    p=90;
elseif x == 0&&y<0
    p=-90;
elseif x==0&& y==0
    p=0;
elseif x>0&&y>0
    p=(atan(y/x))*180/pi;
elseif x>0&&y==0
    p=0;
elseif x>0&&y<0
    p=(atan(y/x))*180/pi;
end
disp([r,p])
end
```

Output:

x	y	r	Θ (degree)
2	0	2	0
2	1	2.2361	26.5621
0	3	3	90
-3	1	3.1623	161.5651
-2	0	2	180
-1	-2	2.2361	-116.5651
0	0	0	0
0	-2	2	-90
2	2	2.8284	45.0000

```
>> y=ps(2,0)
        2         0


y =

        2

>> y=ps(2,1)
       2.2361      26.5651


y =

       2.2361

>> y=ps(0,3)
        3        90


y =

        3

>> y=ps(-3,1)
       3.1623    161.5651


y =

       3.1623

>> y=ps(-2,0)
        2      180
```

```
y =

     2

>> y=ps(-1,-2)
    2.2361 -116.5651


y =

    2.2361

>> y=ps(0,0)
     0     0


y =

     0

>> y=ps(0,-2)
     2   -90


y =

     2

>> y=ps(2,2)
    2.8284   45.0000


y =

    2.8284
```

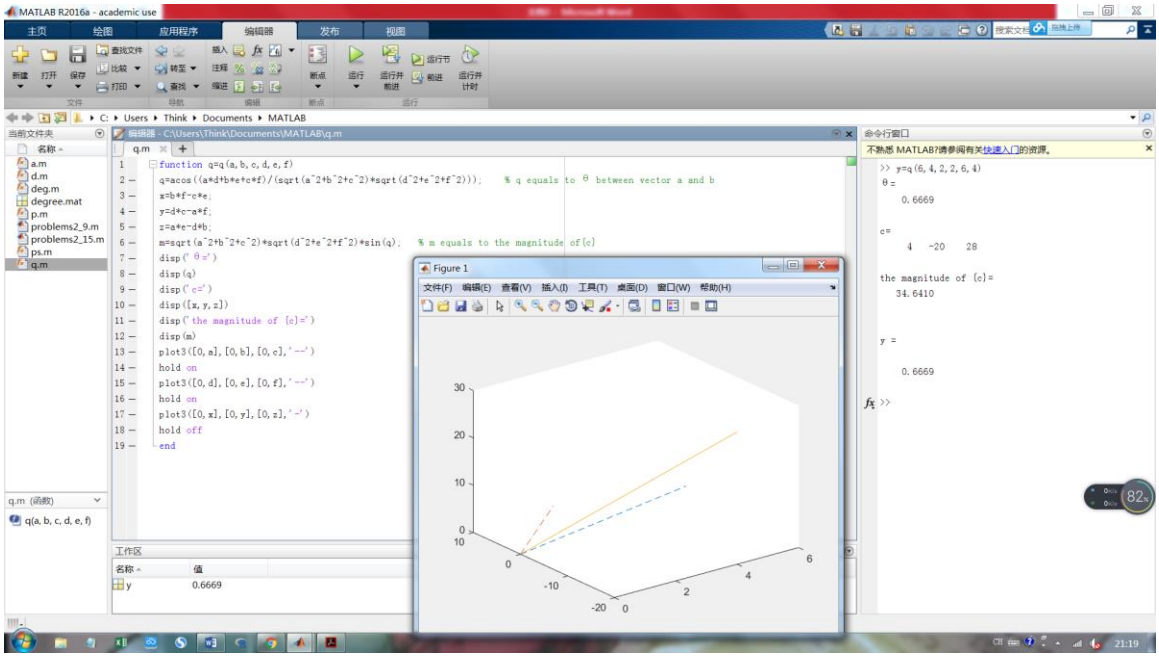
Comments:

```
function [r,p]= ps(x,y) %function name is p, r means radius, and
p means the angle θ
r=sqrt(x.^2+y.^2);  % formula to compute radius
if x<0&&y>0    %in fact, if x>0 or x<0, we can use this formula to
calculate p
    p=(atan(y/x)+pi)*180/pi;
elseif x<0&&y<0
    p=(atan(y/x)-pi)*180/pi;
elseif x<0 &&y==0
    p=180;
```

```
elseif x == 0&&y>0    %when x=0, y/x would make an error
   p=90;
elseif x == 0&&y<0
   p=-90;             %we use semi-colon to prevent the result of
p from displaying for several times repeatedly
elseif x==0&& y==0
   p=0;
elseif x>0&&y>0
   p=(atan(y/x))*180/pi;
elseif x>0&&y==0
   p=0;
elseif x>0&&y<0
   p=(atan(y/x))*180/pi;
end
disp([r,p])        %to display the result
end
```

Problem3_20(q.m)

Overall:

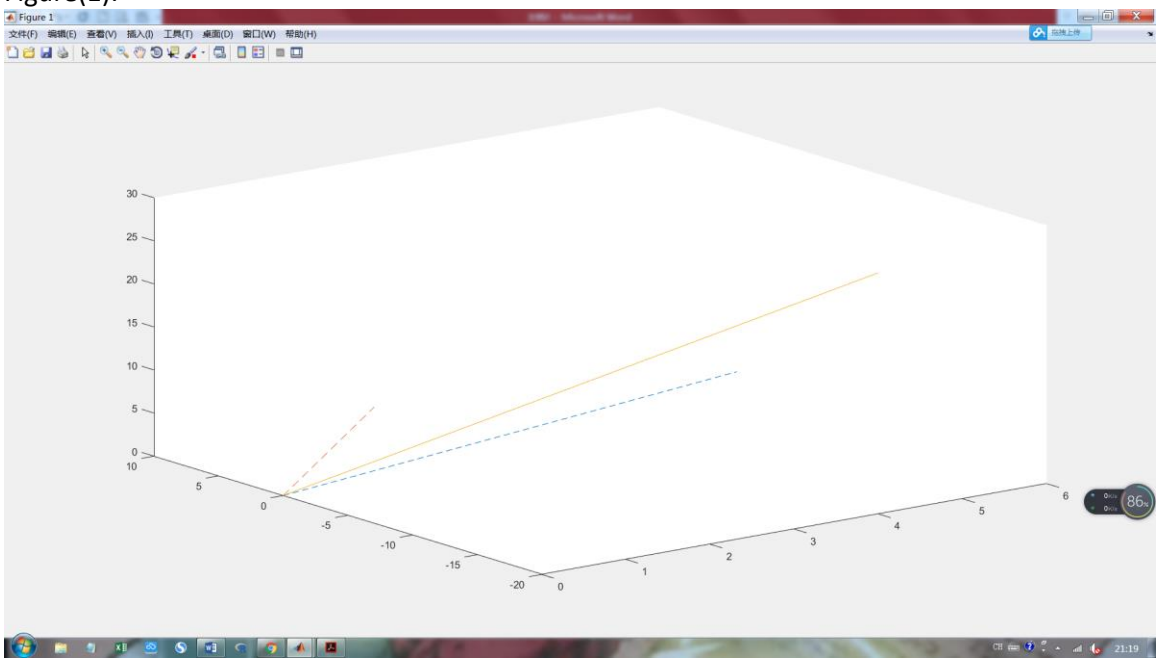


Code:

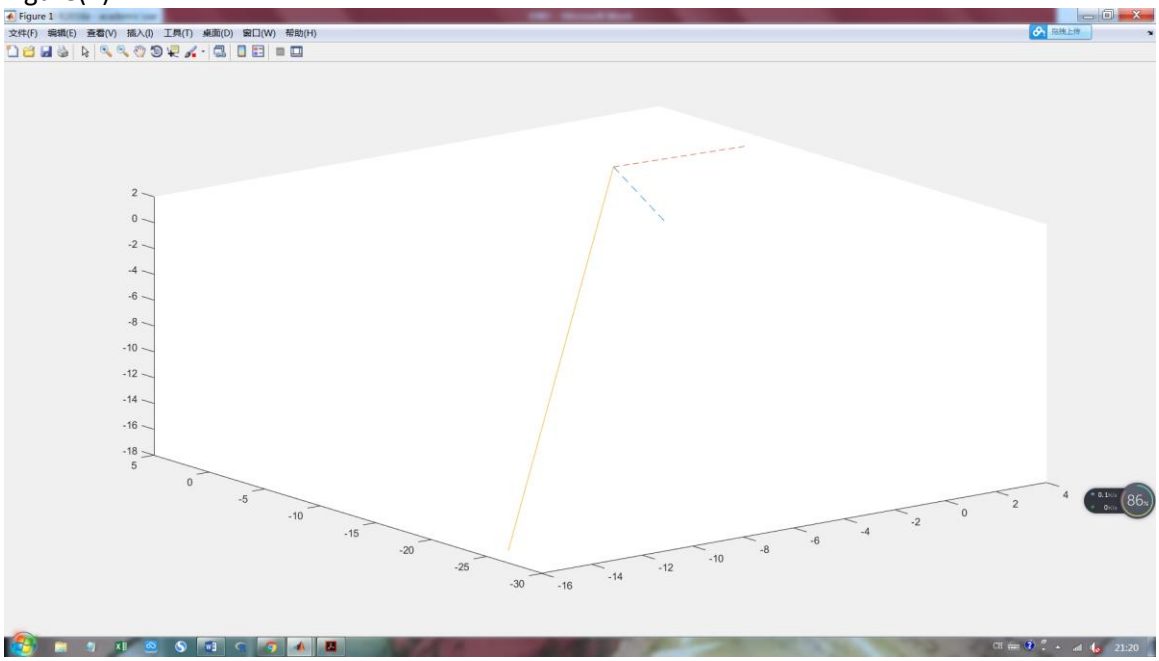
```
function q=q(a,b,c,d,e,f)
q=acos((a*d+b*e+c*f)/(sqrt(a^2+b^2+c^2)*sqrt(d^2+e^2+f^2)));    %
q equals to ¦È between vector a and b
x=b*f-c*e;
y=d*c-a*f;
z=a*e-d*b;
m=sqrt(a^2+b^2+c^2)*sqrt(d^2+e^2+f^2)*sin(q);   % m equals to the
magnitude of{c}
disp('¦È=')
disp(q)
disp('c=')
disp([x,y,z])
disp('the magnitude of {c}=')
disp(m)
plot3([0,a],[0,b],[0,c],'--')
hold on
plot3([0,d],[0,e],[0,f],'--')
hold on
plot3([0,x],[0,y],[0,z],'-')
hold off
end
```

Output:

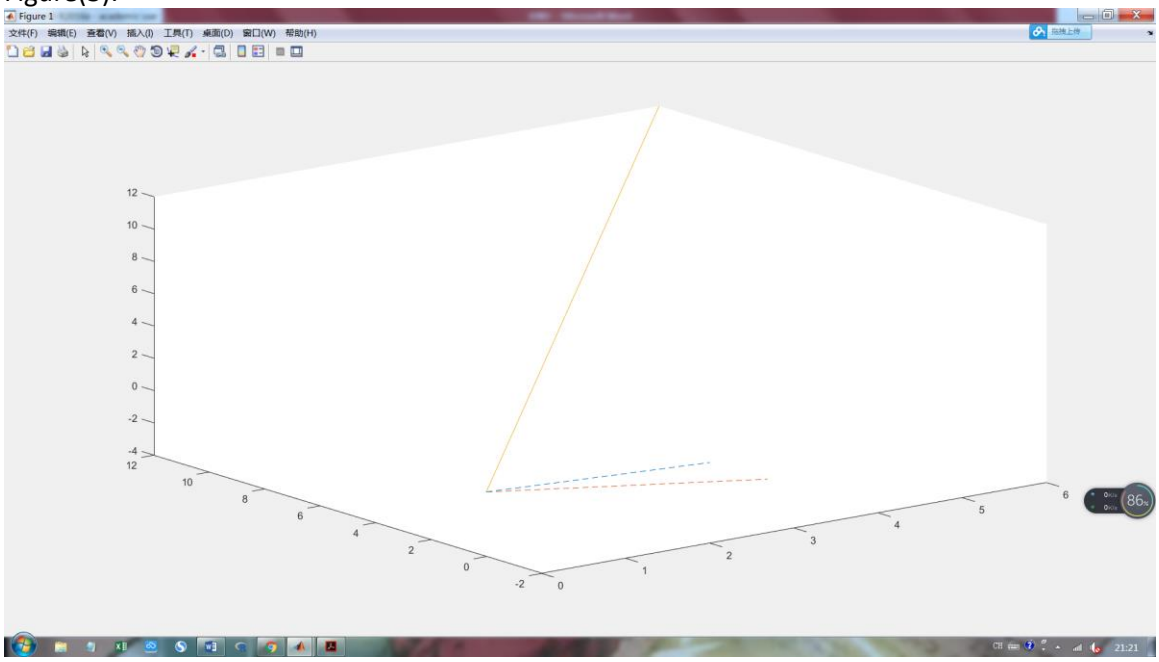
Figure(1):



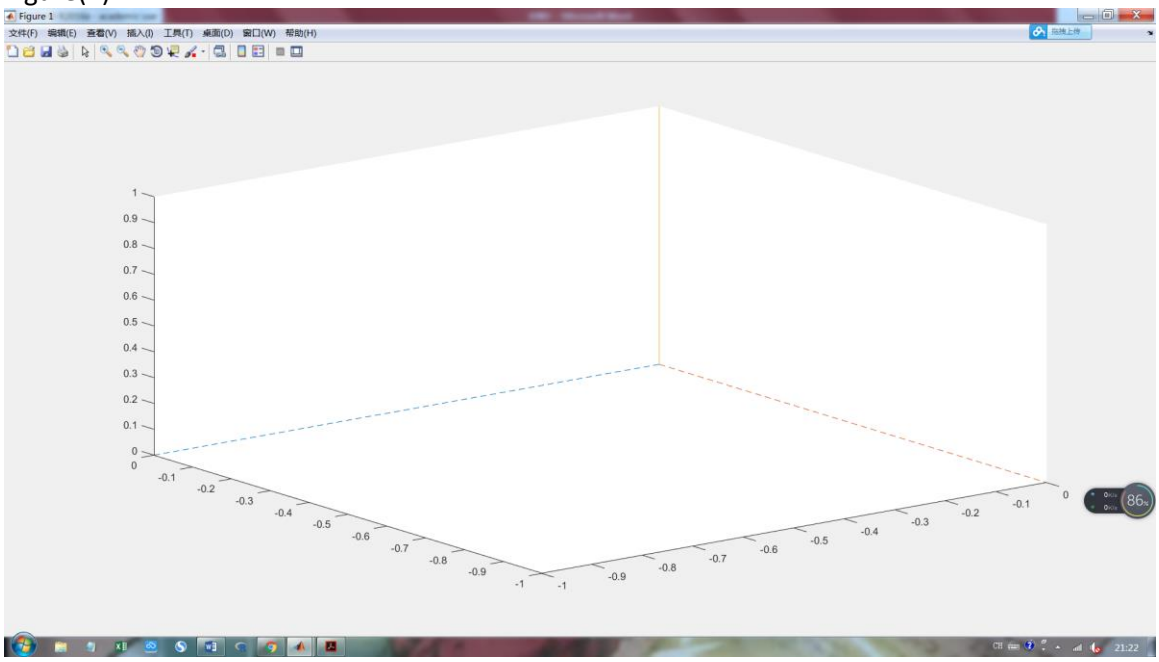
Figure(2):



Figure(3):



Figure(4):




```
>> y=q(6,4,2,2,6,4)
 θ =
       0.6669

c=
        4     -20        28
```

```
the magnitude of {c}=
    34.6410


y =

    0.6669

>> y=q(3,2,-6,4,-3,1)
θ =
    1.5708

c=
   -16   -27   -17

the magnitude of {c}=
    35.6931


y =

    1.5708

>>  y=q(2,-2,1,4,2,-4)
θ =
    1.5708

c=
     6     12     12

the magnitude of {c}=
    18


y =

    1.5708

>> y=q(-1,0,0,0,-1,0)
θ =
    1.5708

c=
     0     0     1

the magnitude of {c}=
     1
```

y =

1.5708

Comments:

```
function q=q(a,b,c,d,e,f) %{a}in the question is represented by
(a,b,c),{b}in the question is represented by (d,e,f)
q=acos((a*d+b*e+c*f)/(sqrt(a^2+b^2+c^2)*sqrt(d^2+e^2+f^2)));    %
q equals to θ between vector a and vector b
x=b*f-c*e;   %{c}in the question is represented by (x,y,z)
y=d*c-a*f;
z=a*e-d*b;
m=sqrt(a^2+b^2+c^2)*sqrt(d^2+e^2+f^2)*sin(q);   % m equals to the
magnitude of{c},m=|{c}|
disp('¦È=')   %commands to display information
disp(q)
disp('c=')
disp([x,y,z])
disp('the magnitude of {c}=')
disp(m)
plot3([0,a],[0,b],[0,c],'--')   %dashed line for {a}
hold on
plot3([0,d],[0,e],[0,f],'--')   %dashed line for {b}
hold on
plot3([0,x],[0,y],[0,z],'-')    %solid line for {c}
hold off
end
```