clc

clear all

syms x y lam real

f=input('Enter F(x,y): ')

g=input('Enter G(x,y): ')

F=f-lam\*g;

Fd=jacobian(F,[x y lam])

[ax ay alam]=solve(Fd,[x y lam]);

ax=double(ax)

ay=double(ay)

T=subs(f,{x,y},{ax,ay});

T=double(T)

for i=1:length(T)

figure

D=[ax(i)-3,ax(i)+3,ay(i)-3,ay(i)+3];

fprintf('The critical point (x,y) is(%10.3f,%10.3f).',ax(i),ay(i))

fprintf('The functional value is %10.3f\n',T(i))

ezcontour(f,D,'-b')

hold on

h=ezplot(g,D)

set(h,'color',[1,0.7,0.9])

plot(ax(i),ay(i),'k.','markersize',15)

end

TT=sort(T)

f\_min=TT(1)

f\_max=TT(end)

Output1:

Enter F(x,y): x^2-y^2

f =

x^2 - y^2

Enter G(x,y): 2\*y-x^2

g =

- x^2 + 2\*y

Fd =

[ 2\*x + 2\*lam\*x, - 2\*lam - 2\*y, x^2 - 2\*y]

ax =

-1.4142

0

1.4142

ay =

1

0

1

T =

1

0

1

The critical point (x,y) is( -1.414, 1.000).The functional value is 1.000

h =

Contour with properties:

LineColor: 'flat'

LineStyle: '-'

LineWidth: 0.5000

Fill: 'off'

LevelList: 0

XData: [1x251 double]

YData: [251x1 double]

ZData: [251x251 double]

Show all properties

The critical point (x,y) is( 0.000, 0.000).The functional value is 0.000

h =

Contour with properties:

LineColor: 'flat'

LineStyle: '-'

LineWidth: 0.5000

Fill: 'off'

LevelList: 0

XData: [1x251 double]

YData: [251x1 double]

ZData: [251x251 double]

Show all properties

The critical point (x,y) is( 1.414, 1.000).The functional value is 1.000

h =

Contour with properties:

LineColor: 'flat'

LineStyle: '-'

LineWidth: 0.5000

Fill: 'off'

LevelList: 0

XData: [1x251 double]

YData: [251x1 double]

ZData: [251x251 double]

Show all properties

TT =

0

1

1

f\_min =

0

f\_max =

1



output2

output2: Enter F(x,y): 2\*x+2\*x\*y+y

f =

2\*x + y + 2\*x\*y

Enter G(x,y): 2\*x+y-100

g =

2\*x + y - 100

Fd =

[ 2\*y - 2\*lam + 2, 2\*x - lam + 1, 100 - y - 2\*x]

ax =

25

ay =

50

T =

2600

The critical point (x,y) is( 25.000, 50.000).The functional value is 2600.000

h =

Contour with properties:

LineColor: 'flat'

LineStyle: '-'

LineWidth: 0.5000

Fill: 'off'

LevelList: 0

XData: [1x251 double]

YData: [251x1 double]

ZData: [251x251 double]

Show all properties

TT =

2600

f\_min =

2600

f\_max =

2600

>> 