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Lab Assignment - 6

1. Write a MATLAB code to solve the constrained maxima and minima using Lagrange's Multiplier Method.

```
clc
clear
format compact
syms x y lam real
f=input('enter f(x,y) to be extremized: ')
g=input('enter the constraint function 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);
epxl=min(ax);
epxr=max(ax);
epyl=min(ay);
epyu=max(ay)
D=[epxl-0.5 epxr+0.5 epyl-0.5 epyu+0.5 ]
ezcontourf(f,D)
hold on
h=ezplot(g,D)
set(h,'color',[1,0.7,0.9])
for i=1:length(T);
fprintf('the critical point (x,y) is (%1.3f,%1.3f)',ax(i),ay(i))
fprintf('the value of the function is %1.3f\n',T(i))
plot(ax(i),ay(i),'k.','markersize',15)
end
TT=sort(T);
f_min =TT(1)
f_max =TT(end)
```

OUTPUT:

```
enter f(x,y) to be extremized: x^2+2*y^2
f = x^2 + 2*y^2
enter the constraint function g(x,y): x^2+y^2-1
g = x^2 + y^2 - 1
epyu = 1
D = -1.5000  1.5000 -1.5000  1.5000
h =
Contour with properties:
```

LineColor: 'flat'
LineStyle: '-'
LineWidth: 0.5000
Fill: off
LevelList: 0
XData: [1×251 double]
YData: [251×1 double]
ZData: [251×251 double]

Show all properties

the critical point (x,y) is (-1.000,0.000)the value of the function is 1.000

the critical point (x,y) is (1.000,0.000)the value of the function is 1.000

the critical point (x,y) is (0.000,-1.000)the value of the function is 2.000

the critical point (x,y) is (0.000,1.000)the value of the function is 2.000

f_min = 1

f_max = 2



