

```
clear all;
close all

n = 300;
x = linspace(-1,1,n+1);
h = 2/n;
y = x;
[X,Y] = meshgrid(x,y);
alpha = 2;
%figure, surf(alpha*X, alpha*Y, f(alpha*X,alpha*Y), 'EdgeColor','none')
%figure, surfc(alpha*X, alpha*Y, f(alpha*X,alpha*Y), 'EdgeColor','none')
%figure, contour(alpha*X, alpha*Y, log(f(alpha*X,alpha*Y)))
%figure, contourf(alpha*X, alpha*Y, log(f(alpha*X,alpha*Y)))

%compare gradient & diff

function result=f(x,y)
result=100*(y - x.^2).^2 + (1 - x).^2;
end

function [gx,gy]=cal_gradient(x,y)
gx=-400*x*y+400*x.^3+2*x-2;
gy=200*(y-x.^2);
end

function [hxx,hxy,hyx,hyy]=cal_hessian(x,y)
hxx=-400*y+1200*x.^2+2;
hxy=-400*x;
hyx=-400*x;
hyy=200;
end
```