《最优化算法》第二次作业

***Assignment 8.26：***

求解***Rosenbrock***函数的极小点：

Note:初始点终止条件为

**Matlab代码如下：**

function A\_8\_26\_2()

clear;clc;

epsilon\_x =10^(-6);

epsilon\_g =10^(-4);

max\_iter=10000;

xnew=[-2,2];

for k = 1:max\_iter

xcurr=xnew;

g\_curr=grad(xcurr);

if norm(g\_curr) <= epsilon\_g

disp('Terminating: Norm of gradient less than');

disp(epsilon\_g);

k=k-1;

break;

end %if

alpha=linesearch\_secant(xcurr,-g\_curr);

xnew = xcurr-alpha.\*g\_curr;

if norm(xnew-xcurr) <= epsilon\_x\*norm(xcurr)

disp('Terminating: Norm of difference between iterates less than');

disp(epsilon\_x);

break;

end %if

if k == max\_iter

disp('Terminating with maximum number of iterations');

end %if

end %for

disp('Final point =');

disp(xnew');

disp('Number of iterations =');

disp(k);

%------------------------------------------------------------------

%--------------利用割线发迭代alpha value-------------------

function alpha=linesearch\_secant(x,d)

%Line search using secant method

epsilon=10^(-4); %line search tolerance

max = 100; %maximum number of iterations

alpha\_curr=0;

alpha=0.001;

dphi\_zero=d\*grad(x)';

dphi\_curr=dphi\_zero;

i=0;

while abs(dphi\_curr)>epsilon\*abs(dphi\_zero),

alpha\_old=alpha\_curr;

alpha\_curr=alpha;

dphi\_old=dphi\_curr;

dphi\_curr=d\*grad(x+alpha\_curr.\*d)';

alpha=(dphi\_curr\*alpha\_old-dphi\_old\*alpha\_curr)/(dphi\_curr-dphi\_old);

i=i+1;

if (i >= max)&&(abs(dphi\_curr)>epsilon\*abs(dphi\_zero)),

disp('Line search terminating with number of iterations:');

disp(i);

break;

end

end %while

end

%————定义目标函数————

% function y=fun(x)

% y = 100\* (x(2)-x(1))^2 + (1-x(1))^2;

% end

%————定义目标函数的一阶导数————

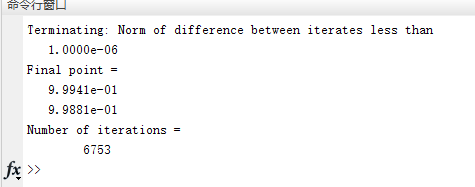
function y=grad(x)

y =[100\*(4\*x(1)^3-4\*x(1)\*x(2))+2\*x(1)-2,200\*(x(2)-x(1)^2)];

end

end

运行结果：



可以看到在迭代6753次之后接近目标极小点：