clear

setenv('BLAS\_VERSION','')

n=900;%换电需求数

min\_price=170;%换电价格范围

max\_price=230;

A=normrnd(36,5,1,25);

E=fix(A);%初始期望，平均值为36，方差为5的高斯分布

a=sum(E)-n;

A=A-a/25;

E=fix(A);

b=sum(E)-n;

A=A-b/25;

E=fix(A);

a1=0.05;a2=0.95;%距离成本与换点价格权重

x=rand(n,1).\*20000;%初始化需求车辆位置

y=rand(n,1).\*20000;

H=[2,2;2,6;2,10;2,14;2,18%初始化换电站位置

6,2;6,6;6,10;6,14;6,18

10,2;10,6;10,10;10,14;10,18

14,2;14,6;14,10;14,14;14,18

18,2;18,6;18,10;18,14;18,18].\*1000;

figure

plot(x,y,'r\*')

hold on

plot(H(:,1),H(:,2),'bo')

legend('user','Change Station')

%% 计算期望与实际期望

D=[];%需求车辆到各换电站的需求比例

price=200.\*ones(1,25);

for i=1:length(H)

for j=1:length(x)

D(i,j)=a1\*sqrt((H(i,1)-x(j))^2+(H(i,2)-y(j))^2)+a2\*price(i);%总费用

end

end

[d1,d2]=min(D);%选择最近距离换电站

C=tabulate(d2(:));%统计选择换电站次数

e=C(:,2);

err=sum(abs(E-e'));%期望差之和，即博弈对象

ER(1)=err;

J=[];

%% 博弈

for k=2:100

j=0;

for i=1:25

if e(i)<E(i) && price(i)>=min\_price

price(i)=price(i)-1;

j=j+1;

end

if e(i)>E(i) && price(i)<=max\_price

price(i)=price(i)+1;

j=j+1;

end

end

J=[J,j];

DD=[];

for i=1:length(H)

for j=1:length(x)

DD(i,j)=a1\*sqrt((H(i,1)-x(j))^2+(H(i,2)-y(j))^2)+a2\*price(i);

end

end

[dd1,dd2]=min(DD);

CC=tabulate(dd2(:));

e=CC(:,2);

err=sum(abs(E-e'));

ER=[ER,err];

end

figure

plot(ER,'-o')

title('Sum of E-e')

set(gcf,'unit','normalized','position',[0.2,0.2,0.64,0.32])

legend('E-e')

figure

plot(J,'r-o')

title('Sum of Price(t)-Price(t-1)')

xlabel('Iterations(t)')

set(gcf,'unit','normalized','position',[0.2,0.2,0.64,0.32])

legend('sum of Price(t)-Price(t-1)')

figure

bar(price,0.5)

hold on

plot([0,26],[min\_price,min\_price],'g--')

plot([0,26],[max\_price,max\_price],'r--')

title('Price of Electricity in Charging Station')

ylabel('Price(￥)')

axis([0,26,0,300])

set(gcf,'unit','normalized','position',[0.2,0.2,0.64,0.32]);

figure

h=bar([e,E'],'gr');

set(h(1),'FaceColor','g'); set(h(2),'FaceColor','r');

axis([0,26,0,50])

title('Expected and Actual Number of Electirc Taxi in CSs')

ylabel('E and e')

set(gcf,'unit','normalized','position',[0.2,0.2,0.64,0.32]);

xlabel('Change Station')

legend('e','E')