实验 4

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学校地图

matlab

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clc;clear;
n=10;   %设置矩阵大小
temp=1;  %设置起始点
m=zeros(n);%定义n阶零矩阵
%设置矩阵中非零非无穷的值
m(1,2)=1;m(1,3)=2;m(1,5)=7;m(1,6)=4;m(1,7)=8;m(1,9)=2;
m(2,1)=1;m(2,3)=2;m(2,4)=3;m(2,7)=7;m(2,9)=10;
m(3,1)=2;m(3,2)=2;m(3,4)=1;m(3,5)=5;m(3,9)=9;
m(4,2)=3;m(4,3)=1;m(4,5)=3;m(4,8)=6;
m(5,1)=7;m(5,3)=5;m(5,4)=3;m(5,6)=3;m(5,8)=4;
m(6,1)=4;m(6,5)=3;m(6,7)=2;m(6,8)=6;m(6,10)=9;
m(7,1)=8;m(7,2)=7;m(7,6)=2;m(7,8)=4;
m(8,4)=6;m(8,5)=4;m(8,6)=6;m(8,7)=4;m(8,9)=4;
m(9,4)=2;m(9,5)=10;m(9,8)=1;m(9,10)=9;
m(10,9)=12;m(10,1)=10;m(10,2)=2;m(10,4)=4;m(10,9)=2;
IDS={'A','B','C','D','E','F','G',"H","I","J","K"};

 bg=biograph(m,IDS);

 set(bg.nodes,'shape','circle','color',[1,1,1],'lineColor',[0.1,0.5,0]);

 set(bg,'layoutType','radial');

 bg.showWeights='on';

 set(bg.nodes,'textColor',[0,0,0],'lineWidth',5,'fontsize',8);

 set(bg,'arrowSize',5,'edgeFontSize',15);

 get(bg.nodes,'position')

 view(bg);
 for i=1:n
     for j=1:n
        if(m(i,j)==0)
            m(i,j)=inf;
        end
     end
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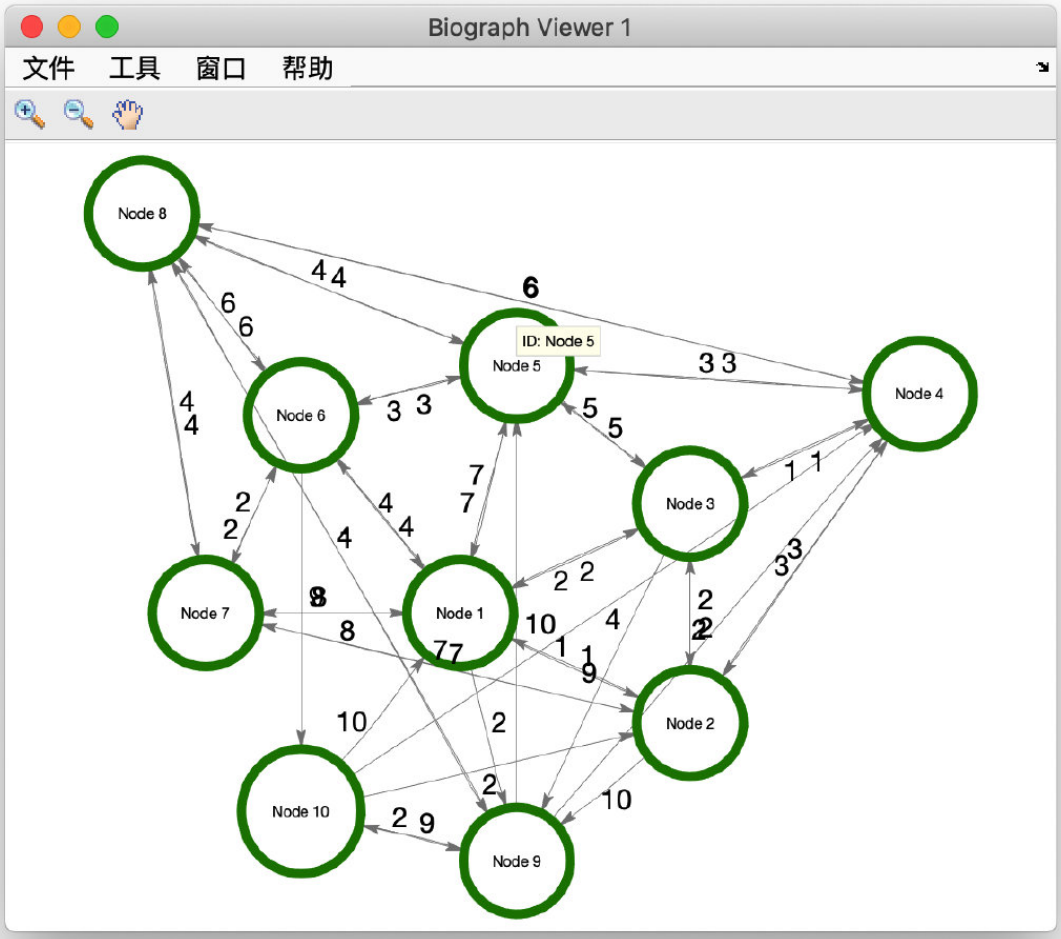
 end

for i=1:n
    m(i,i)=0;
end
pb(1:length(m))=0;pb(temp)=1;%求出最短路径的点为1，未求出的为0
d(1:length(m))=0;%存放各点的最短距离
path(1:length(m))=0;%存放各点最短路径的上一点标号

while sum(pb)<n %判断每一点是否都已找到最短路径
 tb=find(pb==0);%找到还未找到最短路径的点
 fb=find(pb);%找出已找到最短路径的点
 min=inf;
 for i=1:length(fb)
     for j=1:length(tb)
         plus=d(fb(i))+m(fb(i),tb(j));  %比较已确定的点与其相邻未确定点的距离
         if((d(fb(i))+m(fb(i),tb(j)))<min)
             min=d(fb(i))+m(fb(i),tb(j));
             lastpoint=fb(i);
             newpoint=tb(j);
         end
     end
 end
 d(newpoint)=min;
 pb(newpoint)=1;
 path(newpoint)=lastpoint; %最小值时的与之连接点
end


%  help biograph
d
path


```



$$d =$$

$$\begin{matrix} 0 & 1 & 2 & 3 & 6 & 4 & 6 & 3 & 2 & 11 \end{matrix}$$

$$path =$$

$$\begin{matrix} 0 & 1 & 1 & 3 & 4 & 1 & 6 & 9 & 1 & 9 \end{matrix}$$