n=5000;

k=3;

p=0.1;

mat=zeros(n);

for i=1:n

for j=j+1:i+k

jj=j;

if jj>n

jj=mod(jj,n);

end

mat(i,jj)=1;mat(jj,i)=1;

end

end

for i=1:n

for j=i+1;i+k

jj=i;

if jj>n

jj=mod(jj,n);

end

p1=rand(1);

if p1<p

mat(i,jj)=0;mat(jj,i)=0

mat(i,i)=inf;

a=find(mat(i,:)==0);

r=randi(length(a));

jjj=a(r);

mat(i,jjj)=1;mat(jjj,i)=1;

mat(i,i)=0;

end

end

xa=zeros(n\*n,1);

ya=zeros(n\*n,1);

k=1;

for i=1:n

for j=1:n

if mat(i,j)==1

xa(k)=i;

ya(k)=j;

k=k+1;

end

end

end

scatter(xa,ya)

state=zeros(n,1);

sus=1;

infe=2;

recov=3;

t=zeros(n,1);

ti=4;

tr=5;

to=ti+tr;

inip=0.1;

for i=1:n

r=rand(1);

if r<inip;

state(i)=infe;

t(i)=1;

else

state(i)=sus;

t(i)=0;

end

end

period=1000;

rate=zeros(period,1);

for k=1:period

cnt=0;

for i=1:n

if t(i)==0

neigh=find(mat(i,:)==1);

neighn=length(neigh);

neighi=length(find(state(neigh)==infe));

prob=neighi/neighn;

r=rand(1);

if r<prob

t(i)=1;

else

t(i)=0;

end

elseif t(i)>=1&&t(i)<to

t(i)=t(i)+1;

elseif t(i)==to

end

if t(i)==0

state(i)=sus;

elseif t(i)>=1&&t(i)<=ti

state(i)=infe;

cnt=cnt+1;

else

state(i)=recov;

end

rate(k)=cnt/n;

end

for i=1:period

plot(1:1:k,rate(1:k));

hold on

end