

```
kap=1;
QQ=sqrt(2*kap);
T=2;

lamstar=1;
hhh=1.3;

TOL=1e-2;
itmax=50;

N=1e5;
NF=1e6;
sig=1;

dt=T*5e-3;
S=T/dt;
tt=0:dt:T;

lam=zeros(1,S+1);
lamold=zeros(1,S+1);
mu=zeros(1,S+1);
VC=zeros(1,S+1);
alp=zeros(1,S+1);

data=load('oneact.dat');
alp=data(4,:);

tic

err=[1,1,1];

iter=0;

% START ITERATION LOOP HERE !!!!!

while (max(err)>TOL) && (iter<itmax)

lm=lamstar+alp(1);
x=tanh(lm)+lm/2;

sq=x*x/2;
H=(sq-1)*sq-lm*x;
%M1=0;M2=0;M3=0;M4=0;
MM1=0;MM2=0;MM3=0;MM4=0;
for i=1:N
y=x+sig*randn;
sq=y*y/2;
Hnew=(sq-1)*sq-lm*y;
U=rand;
if U<=exp(H-Hnew)
x=y;
H=Hnew;
end
%M1=M1+x;M2=M2+x^2;M3=M3+x^3;M4=M4+x^4;
z=x-1;
MM1=MM1+z;MM2=MM2+z^2;MM3=MM3+z^3;MM4=MM4+z^4;
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end
%M1=M1/N;M2=M2/N;M3=M3/N;M4=M4/N;
MM1=MM1/N;MM2=MM2/N;MM3=MM3/N;MM4=MM4/N;

lam(1)=lm;
%muef(j+1)=M1;
mu(1)=MM1+1;

%VV=M1-M3;
%VVCC=M2-M4;
%C2=M2-M1^2;
VV=-(2*MM1+3*MM2+MM3);
VVCC=-(2*MM1+5*MM2+4*MM3+MM4);
VVCC=VVCC-VV*(MM1+1);
C2=MM2-MM1^2;
VC(1)=VVCC/C2;

lm=lm+(VV+2*QQ*alp(1))*dt/C2;
%CCC=(1+VVCC*dt)*CCC;
%x=M1+VV*dt;
x=MM1+1+VV*dt;

for j=1:S

sq=x*x/2;
H=(sq-1)*sq-lm*x;
%M1=0;M2=0;M3=0;M4=0;
MM1=0;MM2=0;MM3=0;MM4=0;
for i=1:N
y=x+sig*randn;
sq=y*y/2;
Hnew=(sq-1)*sq-lm*y;
U=rand;
if U<=exp(H-Hnew)
x=y;
H=Hnew;
end
%M1=M1+x;M2=M2+x^2;M3=M3+x^3;M4=M4+x^4;
z=x-1;
MM1=MM1+z;MM2=MM2+z^2;MM3=MM3+z^3;MM4=MM4+z^4;
end
%M1=M1/N;M2=M2/N;M3=M3/N;M4=M4/N;
MM1=MM1/N;MM2=MM2/N;MM3=MM3/N;MM4=MM4/N;

lam(j+1)=lm;
%CCef(j+1)=CCC;
%muef(j+1)=M1;
mu(j+1)=MM1+1;

%VV=M1-M3;
%VVCC=M2-M4;
%C2=M2-M1^2;
VV=-(2*MM1+3*MM2+MM3);
VVCC=-(2*MM1+5*MM2+4*MM3+MM4);
VVCC=VVCC-VV*(MM1+1);
C2=MM2-MM1^2;
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VC(j+1)=VVCC/C2;

lm=lm+(VV+2*QQ*alp(j+1))*dt/C2;
%CCC=(1+VVCC*dt)*CCC;
%x=M1+VV*dt;
x=MM1+1+VV*dt;

end

plot(tt,lam)
hold on

iter=iter+1
errnew=max(abs(lam-lamold))
err=[err(2),err(3),errnew];
%figure
%plot(tt,lam-lamold)
lamold=lam;

alp(S+1)=hhh;
for j=S+1:-1:2
    alp(j-1)=(1+VC(j)*dt)*alp(j);
end

%figure
%plot(tt,alp)

end

%figure
%plot(tt,lam,'-b')
%axis([0 2 0 1.5])
%hold on

POLmu=polyfit(tt,mu,6);
mus=polyval(POLmu,tt);

% get initial entropy

lm=lamstar;
x=tanh(lm)+lm/2;

sq=x*x/2;
H=(sq-1)*sq-lm*x;
Free=0;
for i=1:Nf
    y=x+sig*randn;
    sq=y*y/2;
    Hnew=(sq-1)*sq-lm*y;
    U=rand;
    if U<=exp(H-Hnew)
        x=y;
        H=Hnew;
    end
end
Free=Free+exp((lam(1)-lm)*x);
end
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Free=Free/NF;
Free=log(Free)

entropy=(lam(1)-lm)*mus(1)-Free

alpm=alp(1:S);alpp=alp(2:S+1);
dynent=QQ*(sum(alpm.^2)+sum(alpp.^2))*dt/2

toc

actval=entropy+dynent

%data=[lam;mu;mus;alp];
%save 'oneact.dat' data -double -ascii
```