Simul H for experimental data

version 3.22b

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for Matlab 2022B

```matlab
clear all
close all

cd("C:\Users\ekrde\Desktop\data log")
%%%% a6, xxb_max=7,
%%%  a8, xxb_max=7
%%%  a10, xxb_max=3
xxa=8;
xxb=2;
[data,sname]=data_file(xxa,xxb)
```

```
sdataname = 1×7 cell

 'r8cm400C'   'r8cm600CB'  'r8cm600C'   'r8cm600CE2f''r8cm800CE2A''r8cm800CE2B''r8cm800CE2

      Eliga numericamente la base de datos con la que desea trabajar el dia de hoy
data = 377×7

   13.0000   46.0000   57.0000  582.0000  579.0000  395.0000   28.6000
   13.0000   47.0000    7.0000  583.0000  579.2000  392.4000   28.5000
   13.0000   47.0000   17.0000  583.7000  579.2000  390.1000   28.4000
   13.0000   47.0000   27.0000  584.3000  579.2000  387.3000   28.4000
   13.0000   47.0000   37.0000  584.9000  579.2000  382.9000   28.5000
   13.0000   47.0000   47.0000  585.3000  579.1000  379.1000   28.5000
   13.0000   47.0000   57.0000  585.7000  579.0000  375.9000   28.5000
   13.0000   48.0000    7.0000  586.0000  578.8000  373.3000   28.5000
   13.0000   48.0000   17.0000  586.2000  578.6000  370.7000   28.4000
   13.0000   48.0000   27.0000  586.5000  578.4000  368.5000   28.4000


 sname = 'r8cm600CB'
```
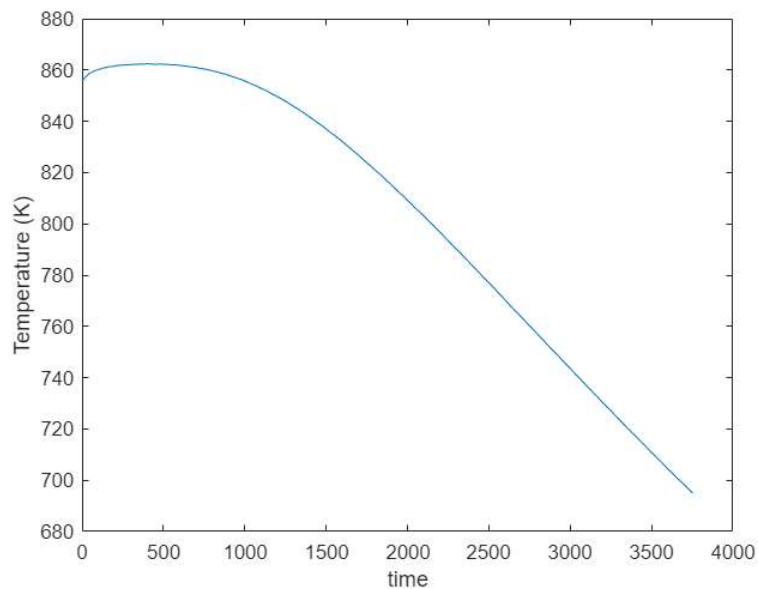
```matlab
% from thesis and paper for 3 samples
if xxa==6
    rho= 2202.4;
elseif xxa==8
    rho=2243.2;
elseif xxa==10
    rho = 1740.2;
end

tmm=(data(:,1)-data(1,1))*3600+(data(:,2)-data(1,2))*60+data(:,3)-data(1,3); % cambio de formato de tiempo a segundos.
Temperature_data=data(:,4:6)+273.5;

[T_max,aa]=max(max(Temperature_data));

plot(tmm,Temperature_data(:,aa))
xlabel('time')
ylabel('Temperature (K)')
```

```
tic
t=tmm;
t_grid=round(max(t)/60)
```

```
 t_grid = 63
```

```
LL1=length(t);
data_input=[t,Temperature_data(:,aa)];
%vec=2:50:LL1;
vec=round(linspace(1,LL1,t_grid));
t(vec)
```

```
 ans = 63×1

     0
    60
   120
   180
   240
   300
   360
   420
   490
   550
```

```
Tdata=Temperature_data(:,aa);
LL2=length(vec);
a_size=xxa*.01
```

```
 a_size = 0.0800
```

```
for ii=1:LL2-1
 Tin=Tdata(vec(ii));
   Tin=(Tdata(vec(ii+1))+Tdata(vec(ii)))/2;

   t0=t(vec(ii+1));
    H_0=0.001;
    seed=[Tin,t0,H_0,0.6];
[H_Best, Error, Tmodel_Best]=SimulatedAnealing_SimuH(seed);
Saving_data(ii,:)=[H_Best, Error, Tmodel_Best];
timer(ii)=t0;
end
toc
```
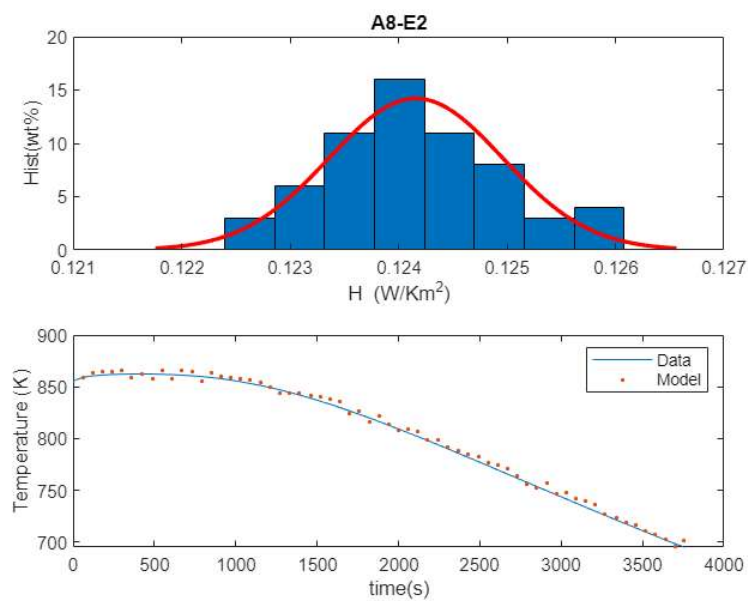
```
 Elapsed time is 21.860027 seconds.
```

```matlab
H_model= Saving_data(:,1);
Errors= Saving_data(:,2);
T_model= Saving_data(:,3);
figure
subplot(2,1,1)
histfit(H_model,8)
xlabel("H (W/Km^2)")
ylabel("Hist(wt%)")
title("A8-E2")

subplot(2,1,2)
plot(t(vec),Tdata(vec))
hold on
plot(timer,T_model,'.')
xlabel("time(s)")
ylabel("Temperature (K)")
legend("Data","Model")
```



```matlab
Stat_H=[mean(H_model), std(H_model), mean(Errors)];

snfile=strcat(sname,"-stats_H.txt")
```
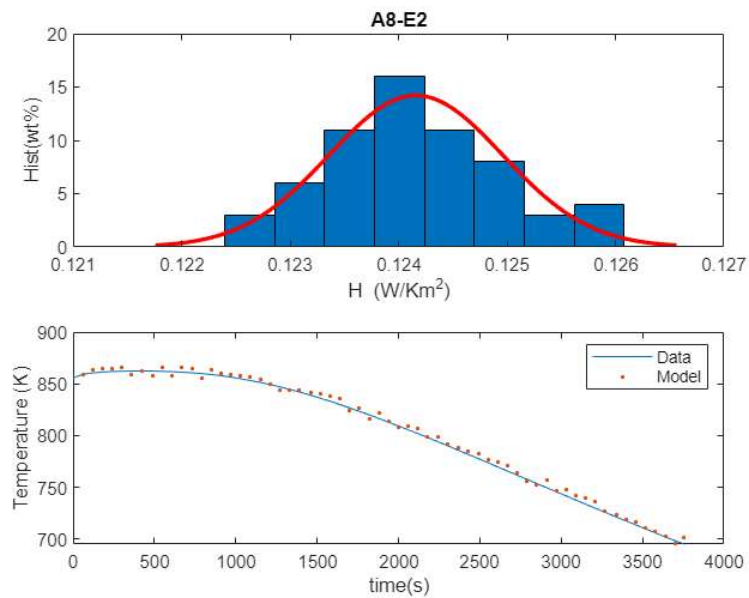
```
 snfile = "r8cm600CB-stats_H.txt"
```

```matlab
cd('C:\Users\ekrde\Desktop\data log\save_data')
save(snfile,'Stat_H','-ascii')
snfile2=strcat(sname,"-plot.svg")
```
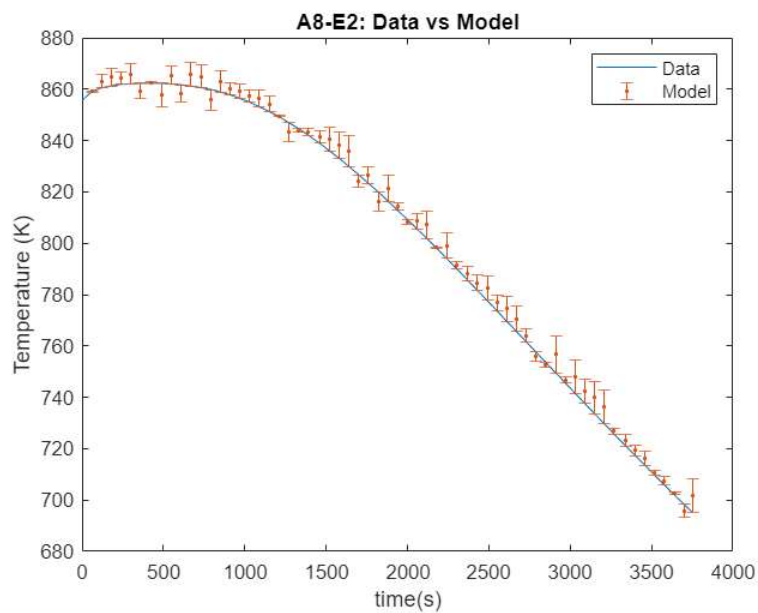
```
 snfile2 = "r8cm600CB-plot.svg"
```

```matlab
print(snfile2,'-dsvg')
```

A8-E2

```
cd ..
```

```
vec2=vec(2:end);
err=Tdata(vec2)-T_model;

figure
 plot(t(vec),Tdata(vec))
 hold on
errorbar(timer,T_model,err,'.')
xlabel("time(s)")
ylabel("Temperature (K)")
legend("Data","Model")
title("A8-E2: Data vs Model")
```


A8-E2: Data vs Model

```
figure
histfit(H_model,8)
xlabel("H (W/Km^2)")
ylabel("Hist(wt%)")
title("A8-E2: Histogram")
```

A8-E2: Histogram