

Simul 4H and experimental data

Ver 3-22b

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Matlab 2022B

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```
clear all
close all

cd("C:\Users\ekrnde\Desktop\data")
xxa=6;
xxb=1;
[data,sname]=data_file_2(xxa,xxb)
```

```
sdataname = 1x7 cell
'r6cm400C' 'r6cm600C' 'r6cm700C' 'r6cm800C' 'r6cm500CE2f' 'r6cm600CE2B' 'r6cm600CE2C'
data = 905x7
    18.0000    3.0000   55.0000   383.8000   374.0000   315.6000   28.6000
    18.0000    3.0000   57.0000   383.9000   374.0000   315.3000   28.5000
    18.0000    3.0000   59.0000   384.0000   374.1000   315.0000   28.5000
    18.0000    4.0000    1.0000   384.0000   374.2000   314.7000   28.4000
    18.0000    4.0000    3.0000   384.1000   374.2000   314.6000   28.4000
    18.0000    4.0000    5.0000   384.2000   374.3000   314.3000   28.4000
    18.0000    4.0000    7.0000   384.3000   374.3000   314.0000   28.3000
    18.0000    4.0000    9.0000   384.3000   374.3000   313.7000   28.3000
    18.0000    4.0000   11.0000   384.4000   374.4000   313.4000   28.2000
    18.0000    4.0000   13.0000   384.4000   374.4000   313.1000   28.2000
```

```
sname = 'r6cm400C'
```

```
%%%%%%%%%%%%%% Modelo lineal %%%%%%%%%%%%%%%
cc=2;
ccmax=1;
```

```
kkData=zeros(cc,ccmax);
ERRORES=zeros(5,ccmax);
ERRORES2=zeros(5,ccmax);
K2=zeros(1,4);
kk=zeros(cc,1);
```

```
% 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;
```

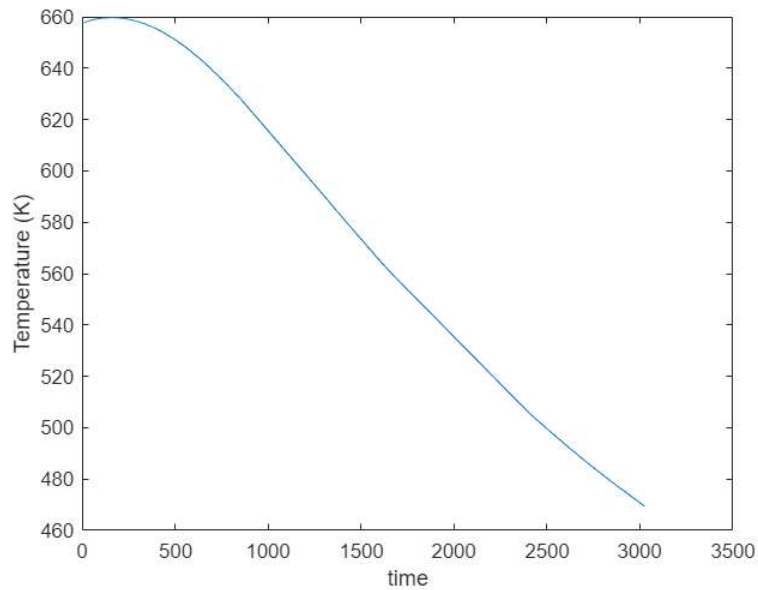
```
[T_max,aa]=max(max(Temperature_data))
```

```
T_max = 659.7000
aa = 1
```

```

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

```



```

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

```

```
t_grid = 50
```

```

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

```

```

ans = 50x1
    0
   36
   74
  110
  148
  184
  222
  258
  296
  332

```

```

Tdata=Temperature_data(:,aa);
LL2=length(vec)

```

```
LL2 = 50
```

```

%H_in=0.025
a_size=xxa*.01

```

```
a_size = 0.0600
```

```

for ii=1:LL2-1
    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]=SimulatedAnnealing_SimuH(seed);

```

```

Saving_data(ii,:)=[H_Best, Error, Tmodel_Best];
timer(ii)=t0;
end
toc

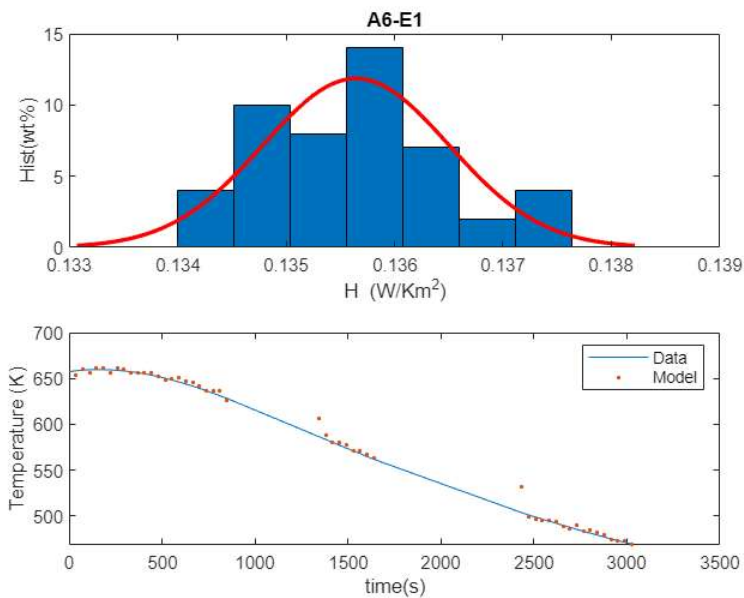
```

Elapsed time is 18.201728 seconds.

```

H_model= Saving_data(:,1);
Errors= Saving_data(:,2);
T_model= Saving_data(:,3);
figure
subplot(2,1,1)
histfit(H_model)
xlabel("H (W/Km^2)")
ylabel("Hist(wt%)")
title("A6-E1")
subplot(2,1,2)
plot(t(vec),Tdata(vec))
hold on
plot(timer,T_model,'.')
xlabel("time(s)")
ylabel("Temperature (K)")
legend("Data", "Model")

```



```

Stat_H=[mean(H_model), std(H_model), mean(Errors)]

```

```

Stat_H = 1×3
    0.1356    0.0009    0.0076

```

```

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

```

```

snfile = "r6cm400C-stats_H.txt"

```

```

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

```

```

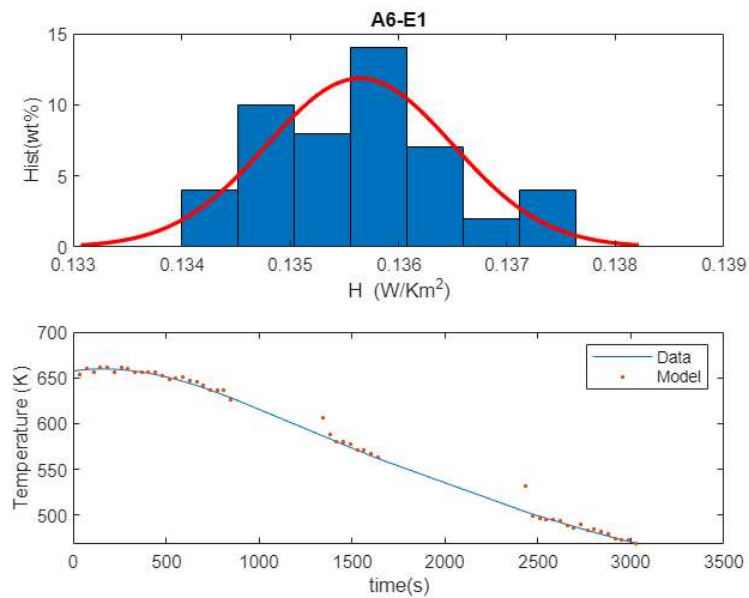
snfile2 = "r6cm400C-plot.svg"

```

```

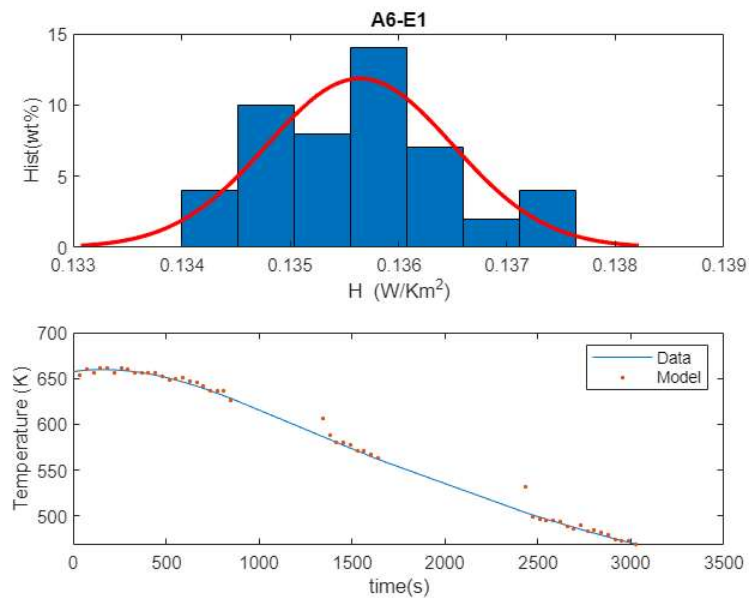
print(snfile2,'-dsvg')

```



```
cd ..
```

```
hold off
```



```
cd('C:\Users\ekrde\Desktop\data log\save_data\newgraf')
```

```
vec2=vec(2:end)
```

```
vec2 = 1x49
    19    38    56    75    93   112   130   149   167   185   204   222   241   259   278   296   315   333   352   370
```

```
Tdata(vec2)
```

```
ans = 49x1
    658.4000
    659.1000
    659.5000
    659.7000
    659.6000
    659.4000
    658.9000
    658.2000
    657.4000
    656.3000
```

```
err=Tdata(vec2)-T_model;
```

```
figure(4)
```

```

plot(t(vec),Tdata(vec))
hold on
errorbar(timer,T_model,err, '.')
xlabel("time(s)")
ylabel("Temperature (K)")
legend("Data", "Model")
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
title("A6-E1: Data vs Model")
snfile3=strcat("A6E1", "-DatavsMode_2.svg")

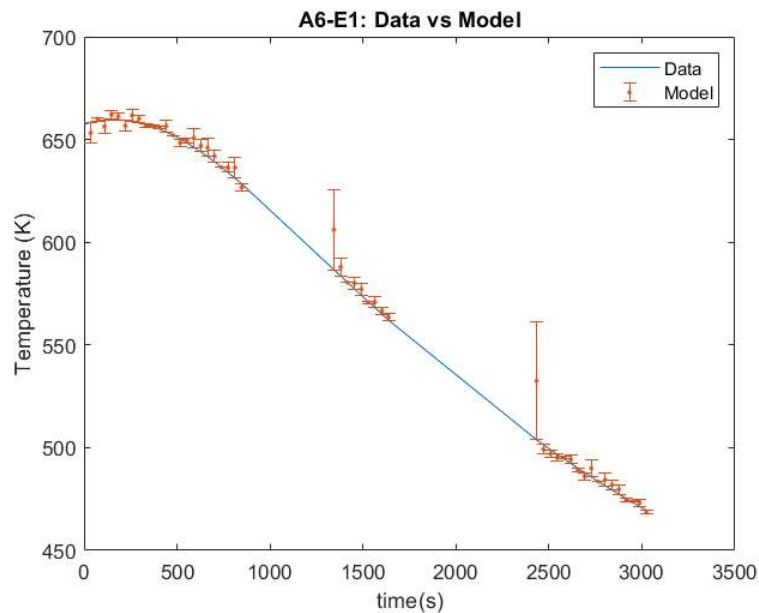
```

```
snfile3 = "A6E1-DatavsMode_2.svg"
```

```

print(snfile3, '-dsvg')
hold off

```



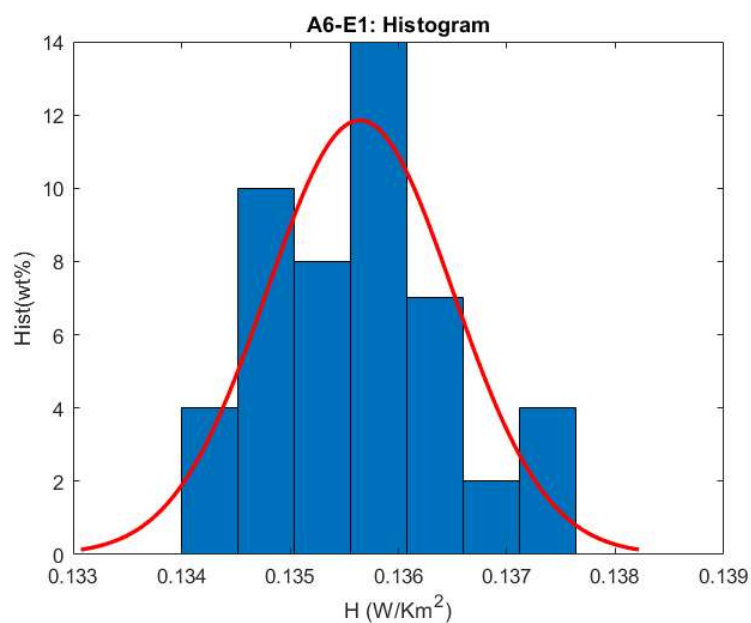
```

figure(5)
histfit(H_model,7)
xlabel("H (W/Km^2)")
ylabel("Hist(wt%)")
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
title("A6-E1: Histogram")
snfile4=strcat("A6E1", "-Hhisto_2.svg")

```

```
snfile4 = "A6E1-Hhisto_2.svg"
```

```
print(snfile4, '-dsvg')
```



```
cd('C:\Users\ekrde\Desktop\data log')
```

```
figure
plot(timer,H_model,'o')
```

