

IGOMU ENE MICHELLE

CHEMICAL ENGINEERING

17/ENG01/013

ENGINEERING MATHEMATICS IV

ASSIGNMENT 5

1ai) commandwindow

```
clearvars
```

```
clc
```

```
format short g
```

```
syms t kp td tp
```

```
v = kp*(1-exp(-((t-td)/tp)))
```

```
ene=xlsread('mydata','data1');
```

```
t1=ene(:,1);
```

```
v=ene(:,2);
```

```
V1=round(ene(900,2),1)
```

```
t0=ones(length(v),1)
```

```
t=[t0 t1]
```

```
[mcoeff, mcoeffint, mresid, mresidint, manova] = regress(v,t);
```

```
%mcoeff
```

```
%rsquaredvalue=mcoeff(10
```

```
mcoeff
```

```
manova
```

```
kp=V1
```

```
td=-mcoeff(1)
```

```
tp=mcoeff(2)
```

OUTPUT

```
mcoeff =
```

0.51588
0.00059065

manova =

0.56546 1169.8 6.976e-165 0.018177

kp =

0.9

td =

-0.51588

tp =

0.00059065

OR

```
commandwindow  
clearvars  
clc
```

```
format short g  
ene=xlsread('mydata','data1');  
t1=ene(:,1);  
V=ene(:,2);  
t0=ones(length(t1),1);  
t=[t0 t1]  
kp=1  
Td=1  
Tp=1
```

```
V=Kp*(1-exp(-(t1-Td)/Tp))
[mcoeff,mcoeffint,mresid,mresidint,manova]=regress(V,t)
mcoeff
Kp=round(ene(900,2),1)
rsquaredvalue=manova(1)
new_coefs=regress(V,t)
```

OUTPUT

manova =

0.0071879 6.5087 0.010899 0.0094147

mcoeff =

0.98096
3.1707e-05

Kp =

0.9

rsquaredvalue =

0.0071879

new_coefs =

0.98096
3.1707e-05

```

Aii) commandwindow
clearvars
clc

format short g
ene=xlsread('mydata','data1');
t1=ene(:,1);
V=ene(:,2);
t0=ones(length(t1),1);
t=[t0 t1]

initials=[1,1];
modelfun=@(beta,t) (beta(1)*(1-exp(-(t1-beta(2)))));
[mcoeff, mcoeffint, mresid, mresidint, manova] =
nlinfit(t1,V,modelfun,initials)
mcoeff
Kp=round(ene(900,2),1)
rsquaredvalue=manova(1)
new_coeffs=nlinfit(t1,V,modelfun,initials)
figure(1);
plot(t,V,'o-r')
xlabel('Time (min)')
ylabel('Volume (litre)')
legend('Experimental o Linearized')

grid on
grid minor
axis tight

```

OUTPUT

mresidint =

4.4899e-05 2.2403e-09

2.2403e-09 0.030378

manova =

0.040356

mcoeff =

0.78355 0.31322

Kp =

0.9

rsquaredvalue =

0.040356

new_coeffs =

0.78355 0.31322

B)Figure(1)

commandwindow

```

clearvars
clc
format short g
syms t kp td tp
v = kp*(1-exp(-((t-td)/tp)))
ene=xlsread('mydata','data1');
t1=ene(:,1);
v=ene(:,2);
V1=round(ene(900,2),1)
t0=ones(length(v),1)
t=[t0 t1]
[mcoeff, mcoeffint, mresid, mresidint, manova] = regress(v,t);
%mcoeff
%rsquaredvalue=mcoeff(1)
mcoeff
manova
kp=V1
td=-mcoeff(1)
tp=mcoeff(2)
figure(1)

plot(t,v(:,1), 'o-r');
xlabel('Time (min)')
ylabel('Volume (litre)')
legend('Experimental o Linearized')

grid on
grid minor
axis tight

```

Figure 2

```

commandwindow
clearvars
clc

format short g
ene=xlsread('mydata','data1');
t1=ene(:,1);
V=ene(:,2);
t0=ones(length(t1),1);
t=[t0 t1]

initials=[1,1];
modelfun=@(beta,t) (beta(1)*(1-exp(-(t1-beta(2)))));
[mcoeff, mcoeffint, mresid, mresidint, manova] =
nlinfit(t1,V,modelfun,initials)
mcoeff
rsquaredvalue=manova(1)
new_coeffs=nlinfit(t1,V,modelfun,initials)
figure(1);
plot(t,V,'o-b')
xlabel('Time (min)')
ylabel('Volume (litre)')

```

```
legend('Experimental o Non-Linear')
```

```
grid on  
grid minor  
axis tight
```

OUTPUT

