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17/ENG06/090

MECHANICAL ENGINEERING

ENG 382 ASSIGNMENT IV ANSWERS

```
commandwindow
clearvars
clc
close all
format short g
syms t Kp Td Tp x
```

```
%Linearized
```

```
v= Kp*(1-exp(-((t-Td)/Tp)))
miebi =xlsread('1587203818odevbesdata','data1');
t1=miebi(:,1);
V=miebi(:,2);
Kp=round(V(900),1);
t0=ones(length(v),1);
t=[t0 t1];
[mcoeff, mcoeffint, mrseid, mresidint, manova]=regress(v,t1);
mcoeff
manova
Td=-mcoeff(1)
Tp=mcoeff(2)
```

```
figure(1)
plot(t1,v)
hold on
plot(t1,V)
grid on
grid minor
xlabel('Time(min)')
ylabel('Volume(m3)')
legend('Experimental','Linearized')
```

```
%non-linear
```

```
ig=[0.1,0.1,0.1,0.1];
modelgest=@(v, t) ig(1)*(1-exp(-((ig(2)-ig(3))/ig*4)));
Oyin =nlinfit(t1,v,ig,modelgest)
figure(2)
plot(t1,v)
hold on
plot(t1,Oyin)
grid on
grid minor
xlabel('Time(min)')
ylabel('Volume(m3)')
legend('Experimental','Nonlinear')
```

```
%comparing
figure(3)
plot(t1,v)
hold on
plot(t1,V)
hold on
plot(t1,Oyin)
grid minor
grid on
xlabel('Time(min)')
ylabel('Volume(m^3)')
legend('Experimental','Linearized','Nonlinear')
```

```
%SAE
[v,t1]=simplefit_data1;
net=fitnet(10,'trainscg');
net.performFcn= 'sae';
net= train(net,x,t)
y=net(x)
e=t1-y
perf= sae(net,t,y)
```

```
%MAE
y=net(v)
e=t-y
perf= mae(e)
```

```
%SSE
[v,t1]=simplefit_data1;
net= fitnet(10);
net.performFcn= 'sse';
net= train(net,x,t)
y=net(x)
e=t1-y
perf= sse(net,t,y)
```