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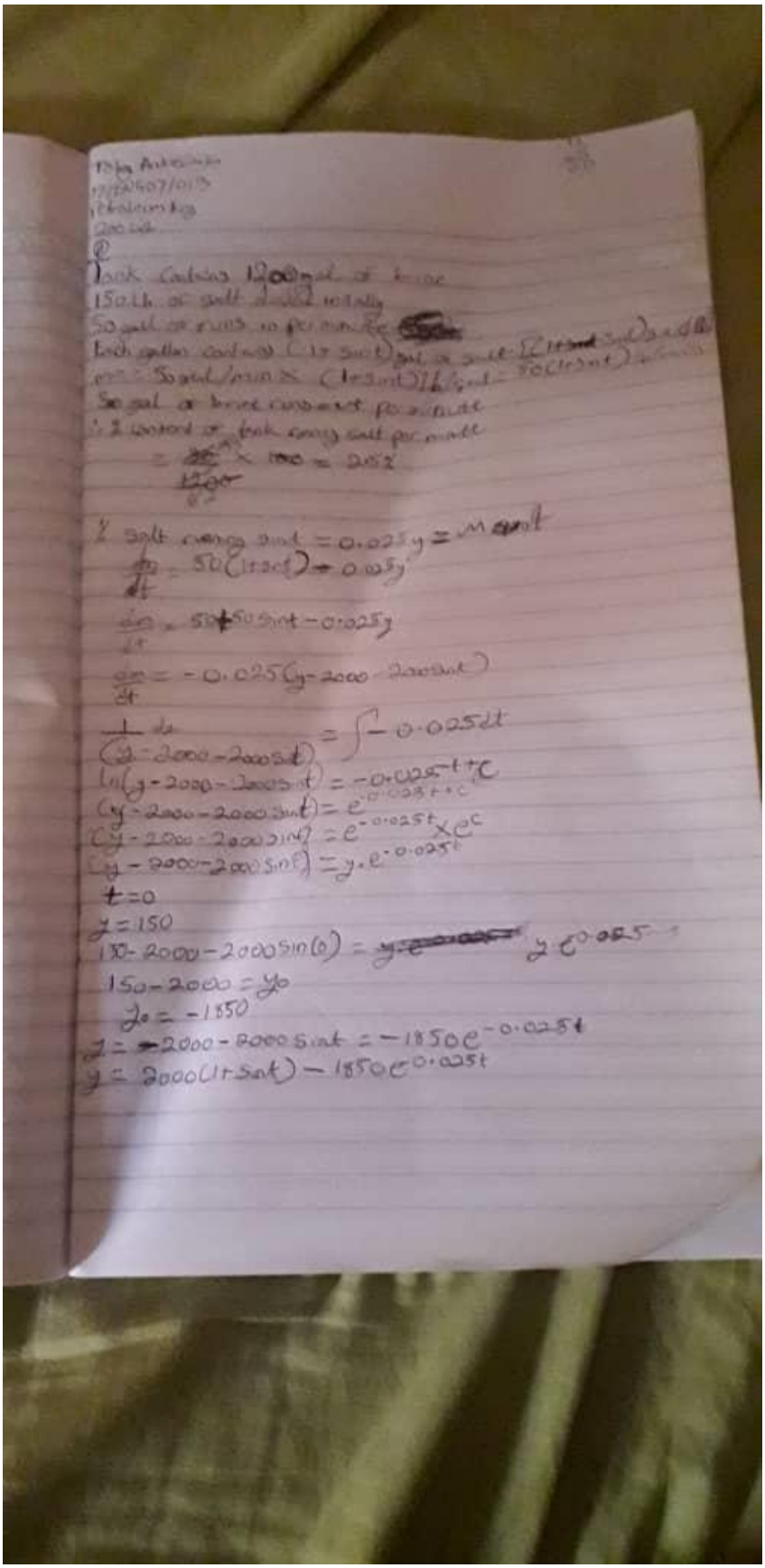
MATRIC NO:18/ENG07/013

DEPARTMENT: PETROLEUM ENGINEERING

COURSE: ENG282



Tank Contains 1200 gal of brine
150 lb of salt dissolved initially
50 gal of brine is pumped in per minute
Each gallon contains $(1+\sin t)$ lb of salt
So $50(1+\sin t)$ lb/min
50 gal of brine comes out per minute
∴ 1 gallon of tank contains $\frac{y}{1200}$ lb salt
$\frac{y}{1200} \times 100 = \frac{y}{12}\%$
$\frac{y}{12}$ salt comes out $= 0.025y = M$ out

$\frac{dy}{dt} = 50(1+\sin t) - 0.025y$

$\frac{dy}{dt} = 50 + 50\sin t - 0.025y$

$\frac{dy}{dt} = -0.025(y - 2000 - 2000\sin t)$

$\frac{1}{(y-2000-2000\sin t)}\,dy = \int -0.025\,dt$

$\ln(y-2000-2000\sin t) = -0.025t + C$

$(y-2000-2000\sin t) = e^{-0.025t+C}$

$(y-2000-2000\sin t) = e^{-0.025t} \times e^{C}$

$(y-2000-2000\sin t) = y \cdot e^{-0.025t}$

$t = 0$

$y = 150$

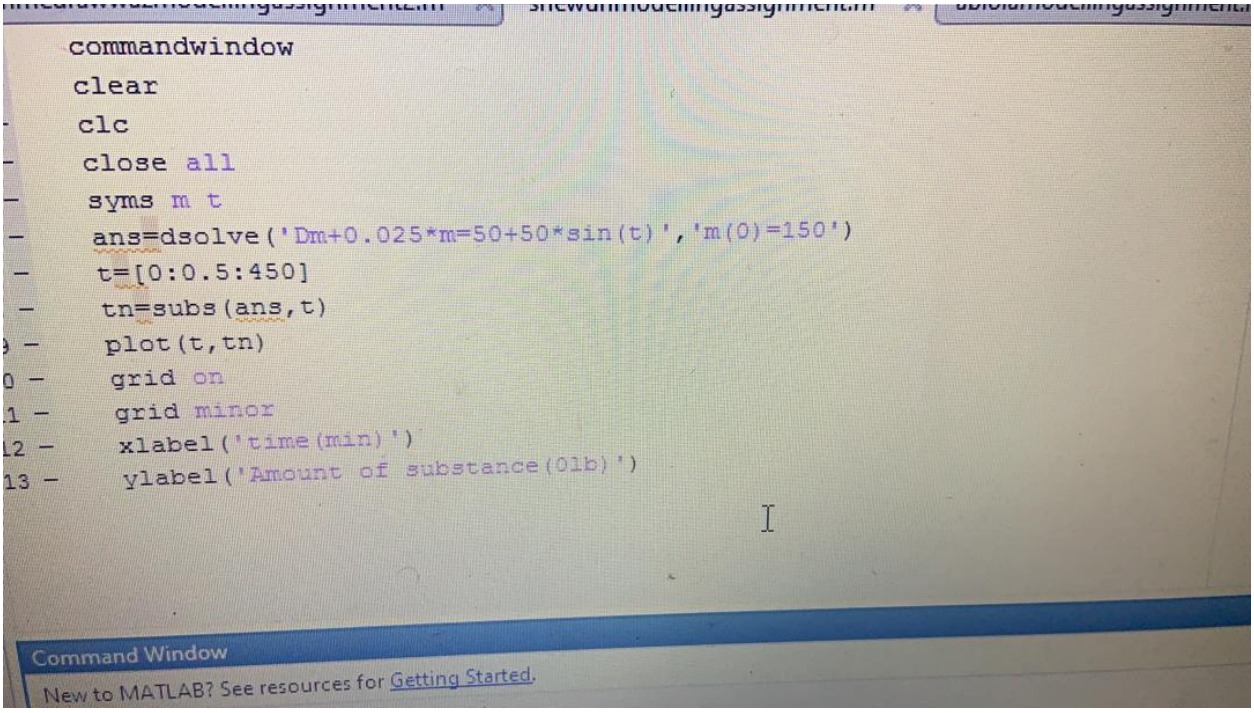
$150 - 2000 - 2000\sin(0) = 2e^{0.025}$

$150 - 2000 = y_0$

$y_0 = -1850$

$y = -2000 - 2000\sin t = -1850e^{-0.025t}$

$y = 2000(1+\sin t) - 1850e^{0.025t}$



```
commandwindow
clear
clc
close all
syms m t
ans=dsolve('Dm+0.025*m=50+50*sin(t)','m(0)=150')
t=[0:0.5:450]
tn=subs(ans,t)
plot(t,tn)
grid on
grid minor
xlabel('time(min)')
ylabel('Amount of substance(0lb)')
```

Command Window

New to MATLAB? See resources for Getting Started.

```
commandwindow
clear
clc
close all
format short g
syms t
y=(50/0.05)+((50/1.0025)*sin(t))+((50*0.05/1.0025)*cos(t))-(802.49*exp(-0.05*t))
ym=1000-(800*exp(-0.05*t))
t=0:1:500
t1=t(2:2:500)
t2=t(1:2:500)
Y=subs(y,t1)
Ym=subs(ym,t2)
mdata={'t(min)','V(litres)';Y,Ym}
plot(t1,Y,t2,Ym)
grid on
grid minor
```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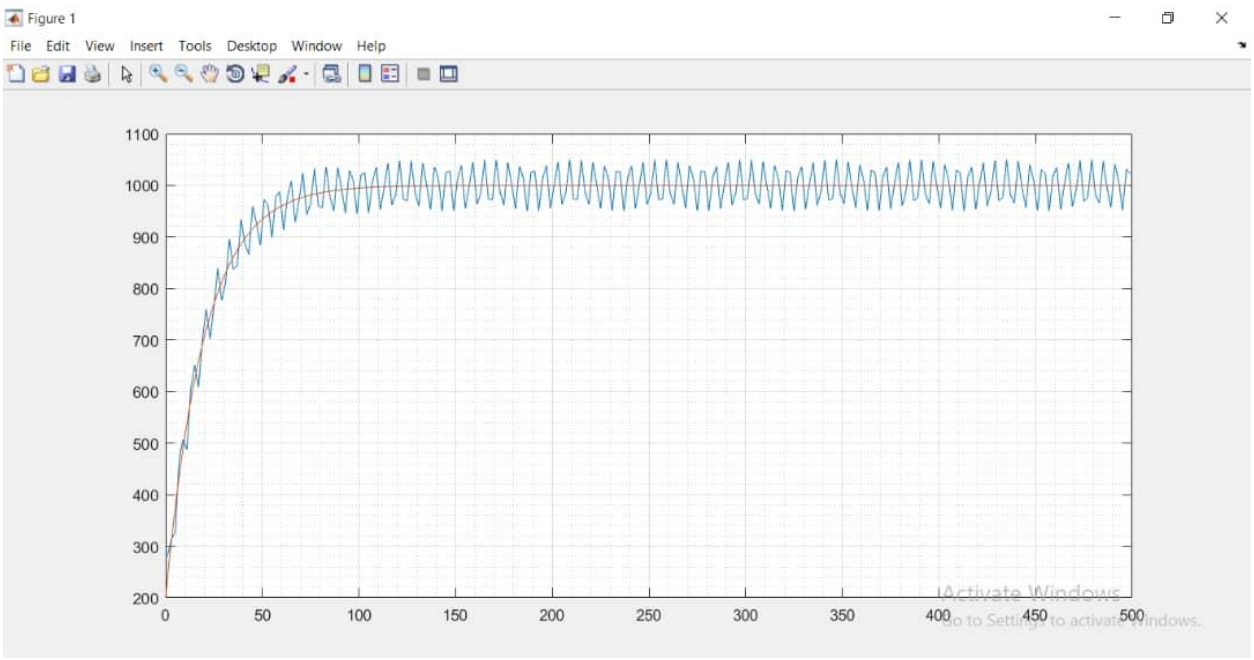
Figure 1
File Edit View Insert Tools Desktop Window Help
1100
1000
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700
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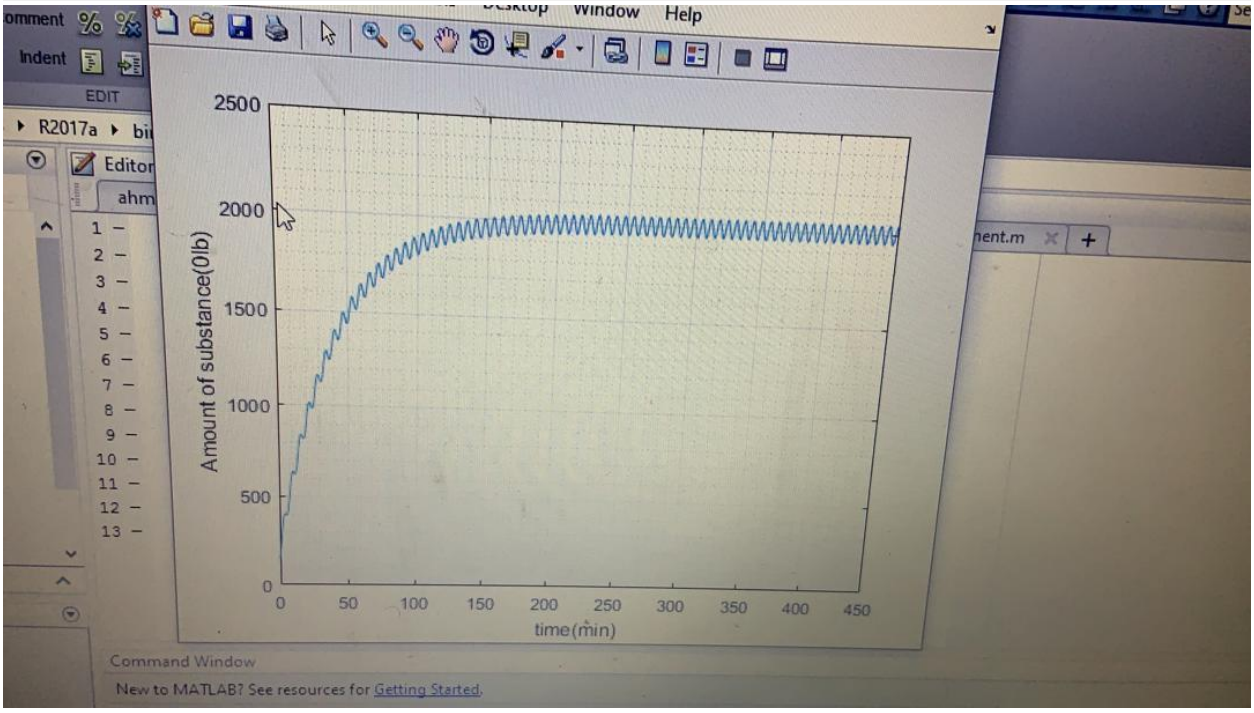
0 50 100 150 200 250 300 350 400 450 500
Activate Windows
Go to Settings to activate Windows.


Window Help
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Editor
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2000
1500
1000
500
0
Amount of substance(0lb)
0 50 100 150 200 250 300 350 400 450
time(min)
Command Window
New to MATLAB? See resources for Getting Started.