$$\int \frac{dy}{(y-2040)} = -0.025 \int dt; \quad \ln(y-2040) = 0.025t + C;$$

$y - 2040 = e^{-0.025t+C}$; $y - 2040 = e^{-0.025t} e^{C}$;

$y - 2040 = e^{-0.025t} y_0$; $y - 2040 = y_0 e^{-0.025t}$;

$y = y_0 e^{-0.025t} + 2040$; initially when $t = 1$

$y = 150$ lb;

$150 = y_0 e^{-0.025t} + 2040$; $150 - 2040 = y_0 \times 1$;

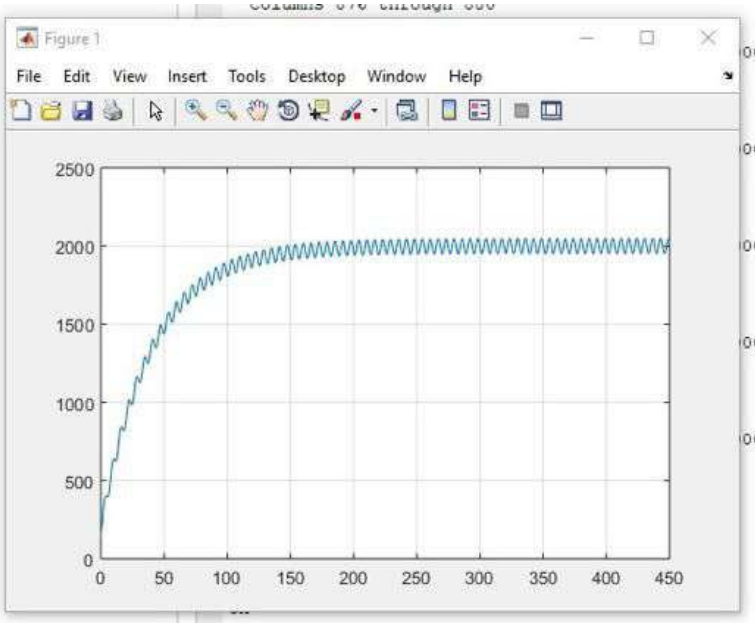
$y_0 = -1890$

50;

$y = 1890 e^{-0.025t} + 2040$

$y = 2040 - 1890 e^{-0.025t}$ Ans

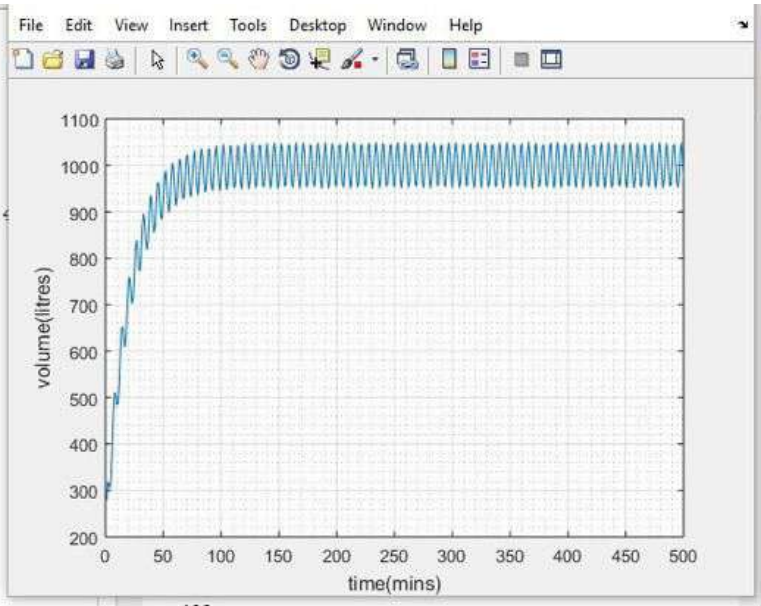
```
commandwindow
clear
clc
close all
syms m t
ans=dsolve('Dm+0.025*m=50+50*sin(t)','m(0)=150')
t=0:0.5:450
tn=subs(ans,t)
plot(t,tn)
grid on
```




```
[ 150, 2000 - (2000*1601^(1/2)*cos(atan(1/40) + 1/2))/1
>>
```

```
commandwindow
clear
clc
close all
syms t
values=[]
t=1:1:500
mean=1000-((exp(-0.05*t))*800)
y=1000+(50/1.0025)*sin(t)+(2.5/1.0025)*cos(t)-((exp(-0.05*t))*802.4

if rem(t,2) ==0
    values=[values,mean]
else
    values=[values,y]
end
excelvalues=transpose(values)
mins=transpose(t)
plot(t,values)
grid on
grid minor
xlabel ('time(mins)')
ylabel('volume(litres)')
xlswrite('odevbesdata.xlsx',{'t(min)'},'veriler','A1')
xlswrite('odevbesdata.xlsx',mins,'veriler','A2')
xlswrite('odevbesdata.xlsx',{'V(Litre)'},'veriler','B1')
xlswrite('odevbesdata.xlsx',excelvalues,'veriler','B2')
```




```
498
499
500
>>
```

FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW Sign in

B2 279.963914100068

t(min)	V(Litre)
1	279.9639
2	318.1907
3	313.8601
4	303.601
5	327.9009
6	393.9593
7	469.1423
8	511.0566
9	506.5922
10	484.0395
11	487.1398
12	534.9268
13	604.2824
14	651.2431
15	651.4694
16	622.6706
17	608.3676
18	637.9229
19	699.585
20	751.3315
21	759.541
22	729.9392
23	702.3679
24	714.1865
25	765.9535
26	820.9421
27	838.9333
28	813.2194
29	776.7953

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Dept: Computer Engineering
matric 18/ENG02/008
Course EdG 282 Assignment V (mathematics II)

① Applying the balance law.
A.r = Input rate of salt - output rate of salt.

The time rate of change for denoting the amount of salt present in the tank at any time t as y, is given as; $\frac{dy}{dt} = y_{in} - y_{out}$

Since 50 gal of brine water enter the tank per minute and one gallon contains $(1 + \sin t)$ lb of salt;

① at $t = 1$; $(1 + \sin t) = (1 + \sin 1) = 1.02$ lb of salt. which means the amount of salt entering the tank is $y_{in} = \frac{50\ gal}{min} \times \frac{1.02\ lb}{gal}$

$= \frac{51\ lb}{min}$

The tank contains 1200 gal of water with the dissolved salt, & 30 gallons of the solution leaves the tank per minute. that is $\frac{30\ gallons}{200\ gallons} - 0.025\% = 25\%$ of the content of the tank.

$y_{out} = 2.5\%$ of y

② Therefore; $\frac{dy}{dt}\ \frac{lb}{min} = 51\ \frac{lb}{min} - 2.5\%$ of $y\ \frac{lb}{min}$

③ $\frac{dy}{dt} = 51 - 0.025y$; $\frac{dy}{dA} = -0.025y + 51$;

$\frac{dy}{dt} = 0.025\left[\frac{-0.025y}{-0.025y} + \frac{51}{-0.025}\right]$; $\frac{dy}{dt} = -0.02(y - 2040)$;

$\frac{dy}{(y - 2040)} = 0.025\,dt$; $\int \frac{dy}{(y - 2040)} = \int -0.025\,dt$;