

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

$$+ 0.025m = 50(1 + \sin t)$$

$$\frac{dy}{dx} + Py = Q \quad \begin{matrix} P = 0.025 \\ Q = 50(1 + \sin t) \end{matrix}$$

$$IF = e^{\int P dx} = e^{\int 0.025 dx} = e^{0.025x}$$

$$\begin{aligned} I \cdot If &= \int Q \cdot IF dx \\ m \cdot IF &= \int Q \cdot IF dt \\ m \cdot e^{0.025t} &= \int 50(1 + \sin t) e^{0.025t} dt \end{aligned}$$

$$m \cdot e^{0.025t} = \int 50(1 + \sin t) e^{0.025t} dt$$

$$m \cdot e^{0.025t} = 50 \int (1 + \sin t) e^{0.025t} dt \quad \text{--- (1)}$$

$$\therefore \left( \frac{e^{0.025t}}{0.025} (1 + \sin t) \right) - \frac{1}{0.025} \int e^{0.025t} \cos t$$

$$\therefore \int (1 + \sin t) e^{0.025t}$$

$$\Rightarrow \left( \frac{e^{0.025t}}{0.025} (1 + \sin t) \right) - \frac{1}{0.025} \left( \frac{e^{0.025t}}{4 \cdot 0.025} \left( \cos t + \frac{\sin t}{0.025} \right) \right)$$

$$\therefore 50 \int (1 + \sin t) e^{0.025t}$$

$$\Rightarrow \frac{50}{0.025} \left( \frac{e^{0.025t}}{4 \cdot 0.025} (1 + \sin t) \right) - \left( \frac{e^{0.025t}}{4 \cdot 0.025} \left( \cos t + \frac{\sin t}{0.025} \right) \right)$$



$$m = 2000 \left( \frac{(1 + \sin t) - 1}{1.000625} (0.025 \cos t + t \sin t) \right) + \frac{C}{e^0}$$

initially when  $t=0$ ,  $m=150$  lb

$$150 = 2000 \left( \frac{(1 + \sin 0) - 1}{1.000625} (0.025 \cos 0 + 0 \sin 0) \right) + \frac{C}{e^0}$$

$$150 = 2000 \left( 1 - \frac{0.025}{1.000625} \right) + C$$

$$C = 150 - 2000 \left( 1 - \frac{0.025}{1.000625} \right)$$

$$C = 150 - 1950.0312304$$

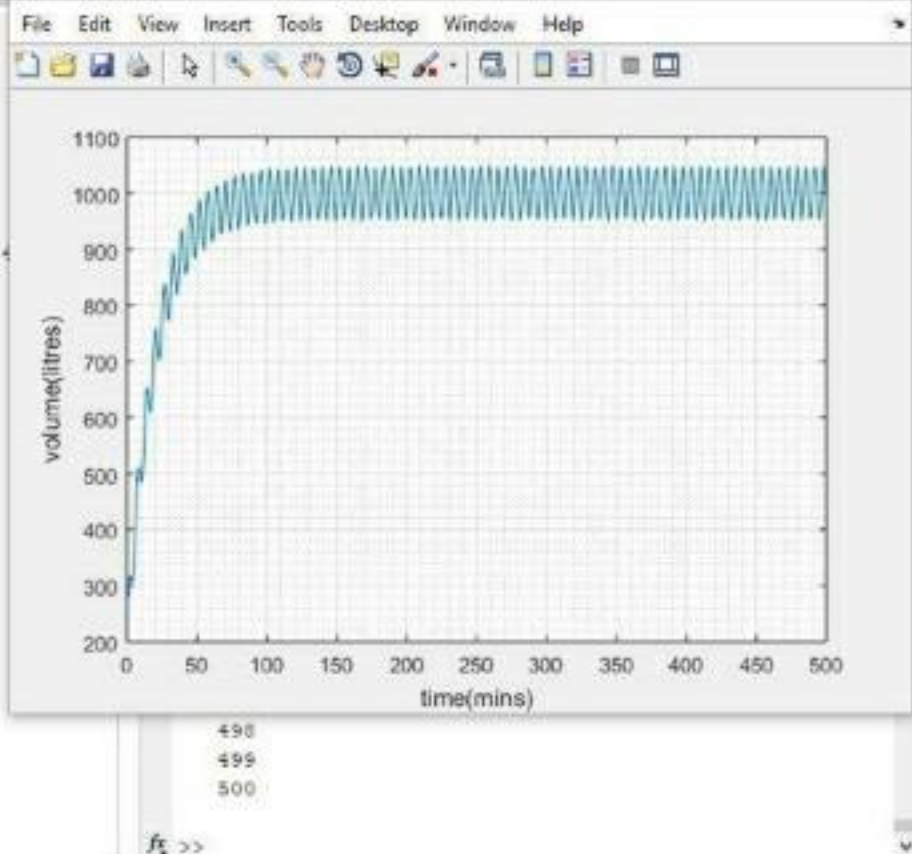
$$\therefore C \Rightarrow -1800.0312304$$



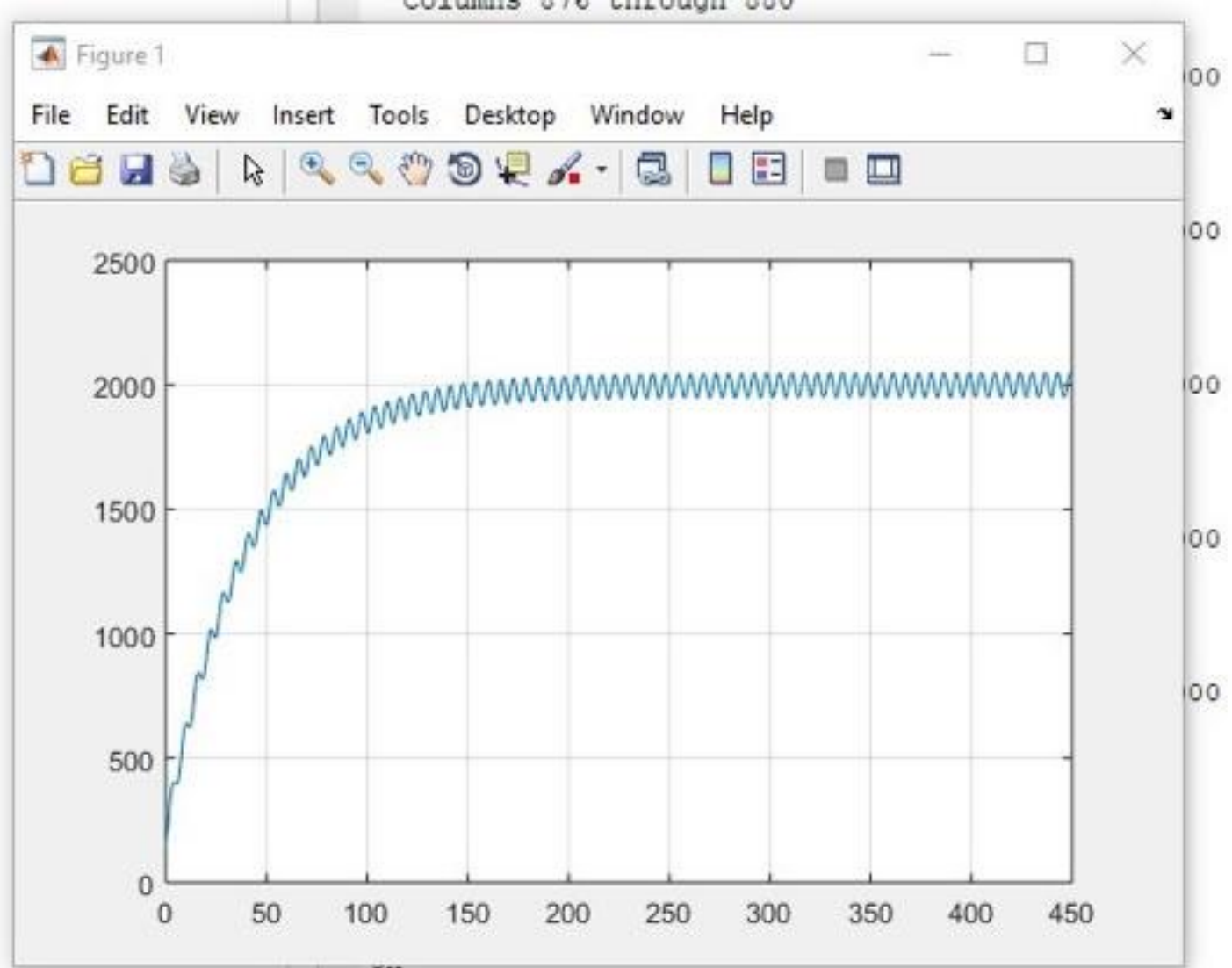
```

1 - commandwindow
2 - clear
3 - clc
4 - close all
5 - syms t
6 - values=[]
7 - t=1:1:500
8 - mean=1000-((exp(-0.05*t))*800)
9 - y=1000+(50/1.0025)*sin(t)+(2.5/1.0025)*cos(t)-((exp(-0.05*t))*802.4
10
11 - if rem(t,2) ==0
12 -     values=[values,mean]
13 - else
14 -     values=[values,y]
15 - end
16 - excelvalues=transpose(values)
17 - mins=transpose(t)
18 - plot(t,values)
19 - grid on
20 - grid minor
21 - xlabel('time(mins)')
22 - ylabel('volume(litres)')
23 - xlswrite('odevbesdata.xlsx',{'t(min)'},'veriler','A1')
24 - xlswrite('odevbesdata.xlsx',mins,'veriler','A2')
25 - xlswrite('odevbesdata.xlsx',{'V[Litre]'},'veriler','B1')
26 - xlswrite('odevbesdata.xlsx',excelvalues,'veriler','B2')
27

```



```
1 - commandwindow
2 - clear
3 - clc
4 - close all
5 - syms m t
6 - ans=dsolve('Dm+0.025*m=50+50*sin(t)', 'm(0)=150')
7 - t=0:0.5:450
8 - tn=subs(ans,t)
9 - plot(t,tn)
10 - grid on
```



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