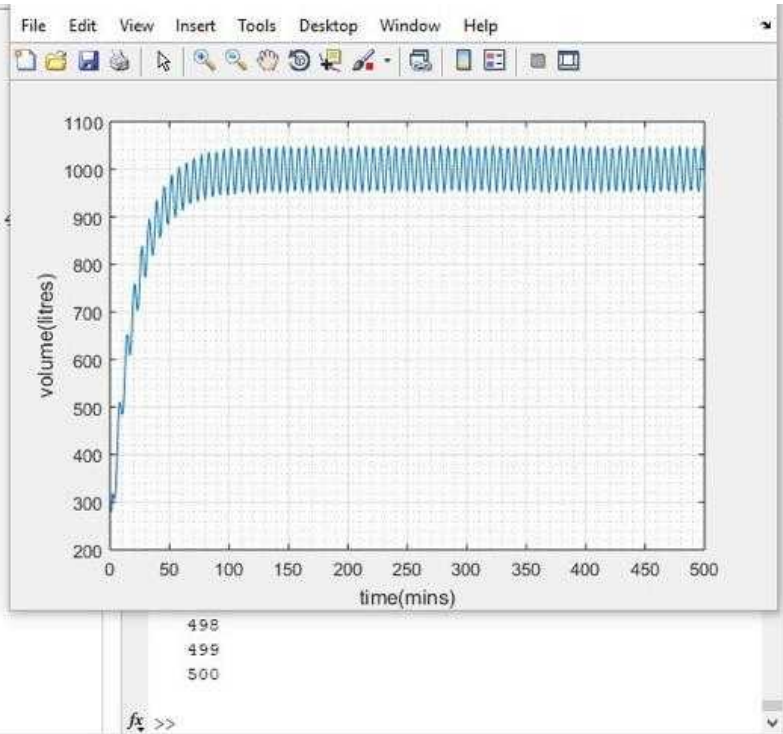




```

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

```



YILKUDI KANGROT NENGALIC

18/ENGG02/100

COMPUTER ENGINEERING

ENGG 282 ASSIGNMENT

① Amount of water = 1200 gal

Amount of salt = 150 lb.

Brine going into the tank = 50 gal containing  
(1 + Sint) lb of Salt

Brine running out of the tank = 30 gal/min.

②  $\frac{dm}{dt} = \text{Min} - \text{Mout}$

$$\frac{dm}{dt} \left( \frac{\text{lb}}{\text{min}} \right) = \left[ 50 \left( \frac{\text{gal}}{\text{min}} \right) \times (1 + \text{Sint}) \left( \frac{\text{lb}}{\text{gal}} \right) \right] - \left[ \frac{30}{1200} m \right]$$

$$\frac{dm}{dt} = 50(1 + \text{Sint}) - 0.025m.$$

b)  $\frac{dm}{dt} = 50(1 + \text{Sint}) - 0.025m$

$$\frac{dm}{dt} + 0.025m = 50(1 + \text{Sint}).$$

$$\frac{dm}{dt} + P_m = Q$$

$$P = 0.025, \quad Q = 50(1 + \text{Sint}).$$

$$\int P \cdot dt = 0.025t$$

$$I \cdot f = e^{\int A dt}$$

$$I \cdot f = e^{0.025t}$$

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

$$y \cdot e^{0.025t} = 50 \int e^{0.025t} + e^{0.025t} \sin t dt$$

$$y \cdot e^{0.025t} = 50 \frac{e^{0.025t}}{0.025} + \int e^{0.025t} \sin t dt$$

Integrating by parts

$$\int e^{0.025t} \sin t dt$$

$$\text{using } \int u dv = uv - \int v du$$

$$\int e^{0.025t} \sin t = e^{0.025t} (\cos t - \int -\cos t \cdot 0.025 e^{0.025t} + C$$

$$\int u dv = uv - \int v du$$

$$= -e^{0.025t} (\cos t + 0.025) [e^{0.025t} \sin t - 0.025 \int \sin t \cdot e^{0.025t} dt]$$

$$Q = -e^{0.025t} (\cos t + 0.025) [e^{0.025t} \sin t - 0.025 \int \sin t \cdot e^{0.025t} dt]$$

$$Q + 6.25^{-1} Q = -e^{0.025t} (\cos t - 0.025) [e^{0.025t} \sin t - 0.025 \int \sin t \cdot e^{0.025t} dt]$$

$$1.000625 Q = -e^{0.025t} (\cos t - 0.025) [e^{0.025t} \sin t - 0.025 \int \sin t \cdot e^{0.025t} dt]$$

$$m = 2000 \frac{50}{1.000625} \quad y = 1601, t = 0$$

$$C = 36.00064$$

$$\text{Substituting } C = 36.00064$$

$$a = -e^{0.025t} \sin t = \frac{-e^{0.025t}}{1.000625} (\cos t - 0.025) + 50C$$

$$y = \frac{2000 - 50}{1.000625} (\cos t - 0.025) + \frac{50C}{e^{0.025t}}$$