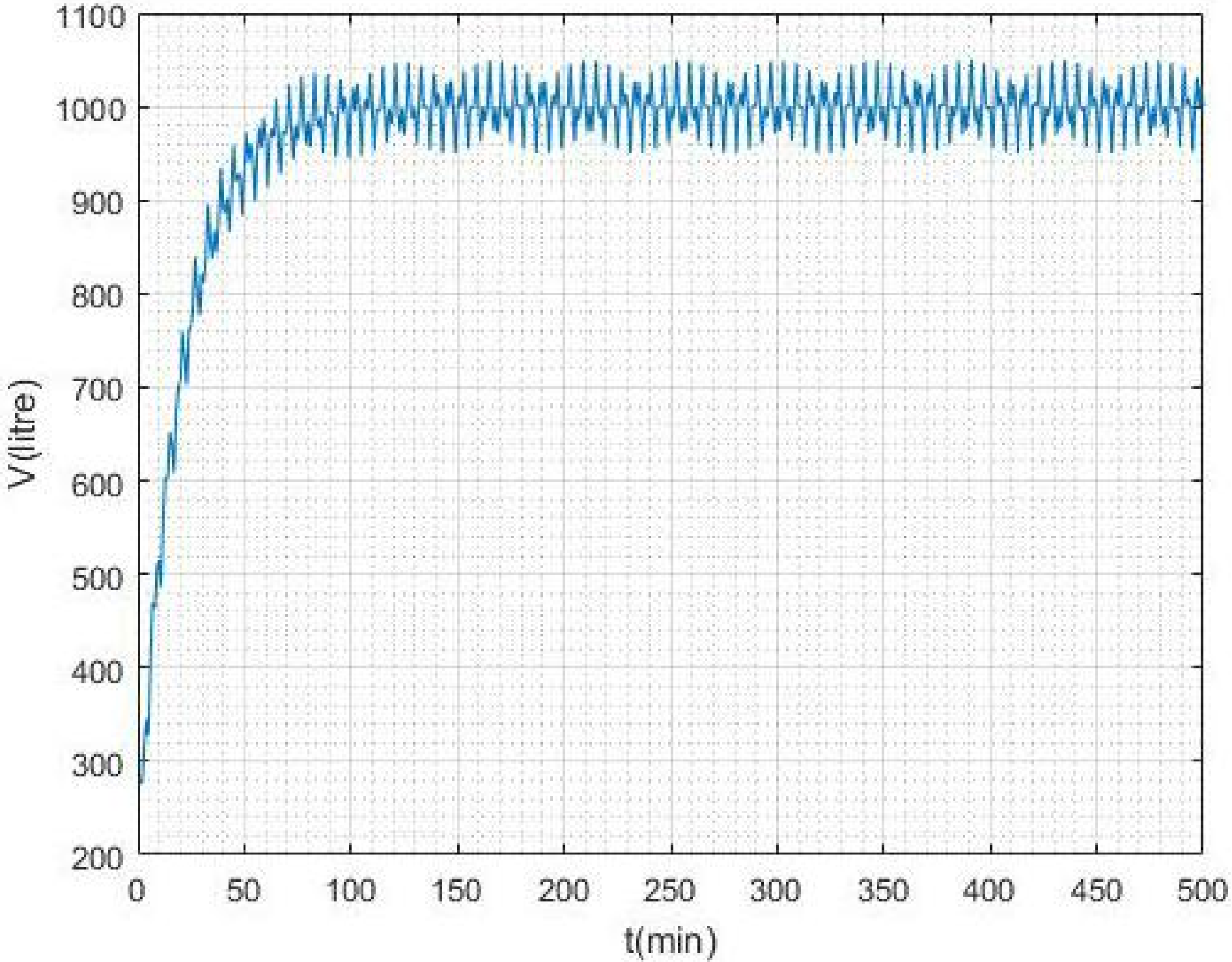
1100
1000
900
800
700
600
500
400
300
200
V(litre)
0
50
100
150
200
250
300
350
400
450
500
t(min)

```
commandwindow
clear
clc
close all
syms t
y = (50/0.05)+((50/1.0025)*sin(t))+(((50*(0.05))/1.0025)*cos(t)
ym = 1000-(800*exp(-0.05*t))
oddValues = 1:2:500
evenValues = 2:2:500
ym = double(subs(y, oddValues))
ymm = double (subs(ym, evenValues))
totTime = 1:1:500
timeTrans = totTime'
c = reshape([ym,ymm],[],1)
combVal = double(c)
plot(totTime, c)
grid on
grid minor
xlabel('T(min)'), ylabel('V(litre)')
col_header = {'t(min)', 'V(Litre)'}
xlswrite['odevbesdata.xlsx',col_header,'veriler','A2')
xlswrite['odevbesdata.xlsx',timeT,'veriler','A3')
xlswrite['odevbesdata.xlsx',combined,'veriler','B2')
```

Workspace

Name	Value
c	62750x1 double
combVal	62750x1 double

script

Ln 23 Col 53

6:52 PM
5/6/2020

NAME: AMOLEMEN EMMANUEL OSEGIE

MATRIC NO: 18/ENG04/015

DEPT: ELECTRICAL ELECTRONICS

1a We should know that Accumulation ratio

" " " " within a system

= { Input ratio − output ratio
  Into system from system

$$\frac{dy}{dt} = U_{in} - U_{out} \quad \cdots (2)$$

Using (2)

b $U_{in} = \frac{50 gal}{min} \times (1 + \sin t) \frac{lb}{gal}$

$U_{in} = 50(1 + \sin t)$ lb/min

$\frac{30}{1200} = 0.025 \times 100 = 2.5\%$

$U_{out} = 2.5\%$ of U

$\frac{dy}{dt} = 50(1 + \sin t)$ lb/min $- 2.5\%$ y lb/min

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

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

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

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

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

integrate both sides

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

$$\ln(y - 2000(1+\sin t)) = -0.025t + c$$

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

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

$$y - 2000(1+\sin t) = e^{-0.025t} y_0$$

$$y = y_0 e^{-0.025t} + 2000(1+\sin t)$$

when $t = 0$ ans initially $y = 150$

$$150 = y_0 e^{-0.025(0)} + 2000(1+\sin 0)$$

$$150 = y_0 + 2000$$

$$y_0 = 150 - 2000 = -1850$$

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

Ex

1c Commandwindow

clear

cls

close all

Syms xt

ans = solve('Dxt + 0.025*xt = 51 + 50*sin(t)', 'x(0) = 150')

```
tn = subs(ans,t)
plot (t,tn)
```