

```
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)|
```

I

Command Window

New to MATLAB? See resources for [Getting Started](#).

445.5000 446.0000 446.5000 447.0000 447.5000 448.0000 448.5000 449.0000 449.5000 450.0000

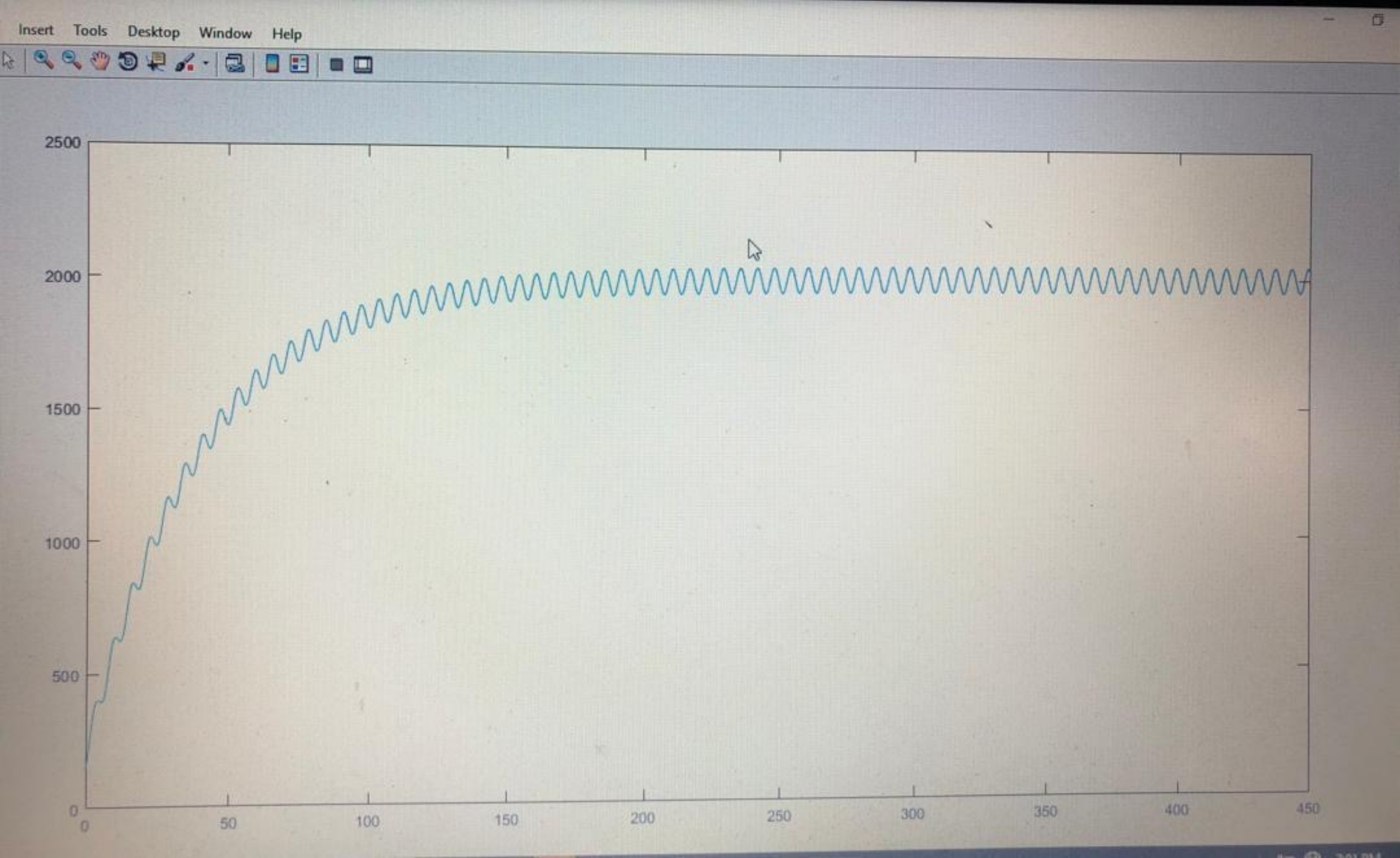
tn =

[ 150, 2000 - (2000\*1601^(1/2)\*cos(atan(1/40) + 1/2))/1601 - (2881850\*exp(-1/80))/1601, 2000 - (20

fx >>

<

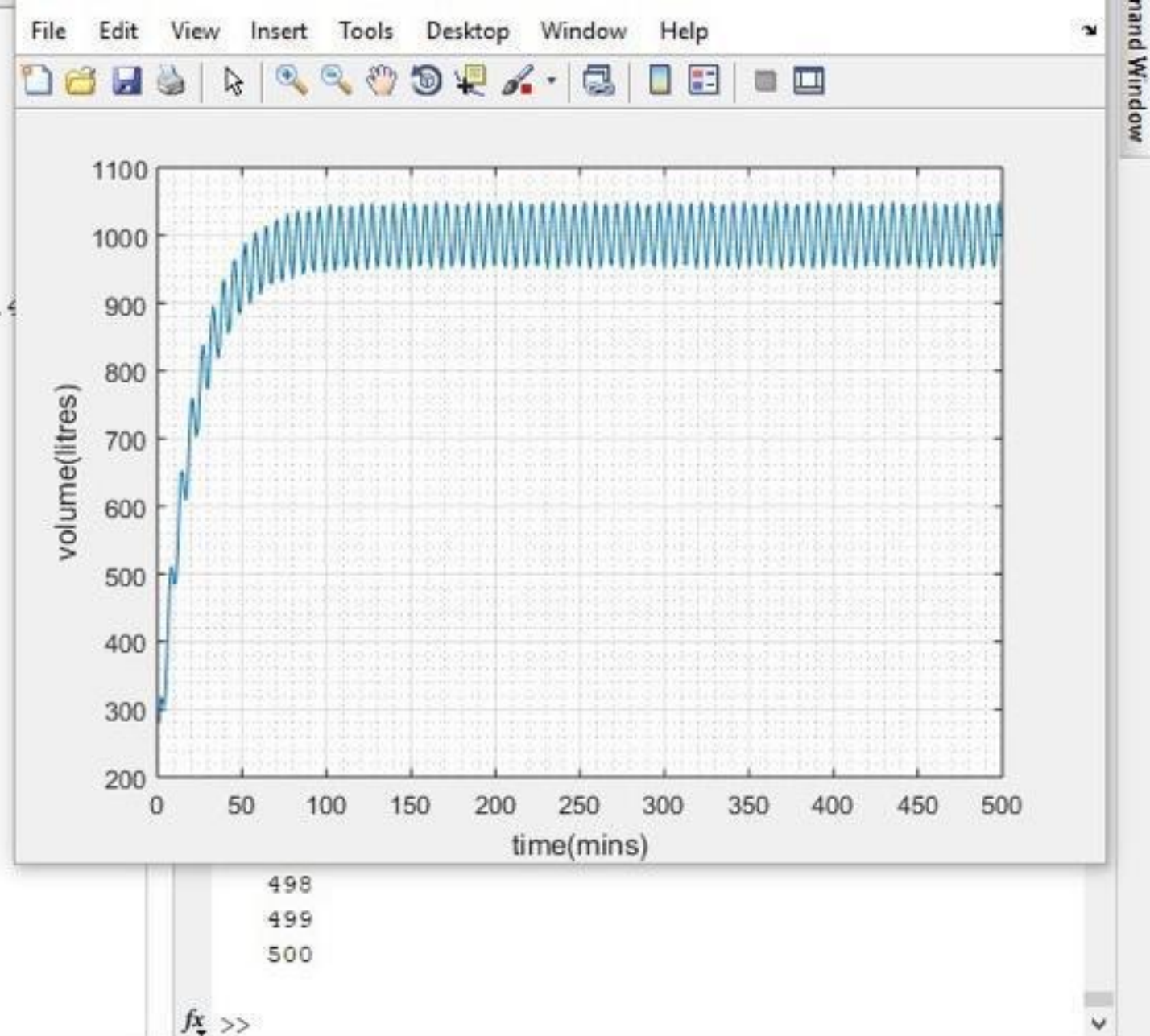
script



```

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

```



DANIGAMA VANCE AJUMITE

181516091002

AERONAUTICAL AND ASTRONAUTICAL ENGINEERING

8

① Mixing.

1200 gal of water, 150 lb of salt both initially.  
50 gal of pure salt & water, each contain 1 lb of salt.

30 gal/min removes from the tank.

Accumulation rate within a system.

Input rate into the - output rate from the system.

$$\frac{ds}{dt} = s_{in} - s_{out} ; \frac{dm}{dt} = M_{in} - M_{out}$$

$$M_{in} = 50 \frac{\text{gal}}{\text{min}} \times (1 + 5\% \text{ salt})$$

$$M_{in} = 50 [1 + 5\%] \text{ lb/min}$$

$$\frac{30 \text{ gal}}{1200 \text{ gal}} = 0.25 = 2.5\% \text{ of the content in the tank.}$$

$$M_{out} = 2.5\% \text{ of } M$$

$$\text{from } \frac{dm}{dt} = M_{in} - M_{out}$$

$$\frac{dm}{dt} = 50(1 + 5\%) - 2.5\% \text{ of } m$$

$$\frac{dm}{dt} = 50(1 + 5\%) - 0.025m$$

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

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

Using the Linear equation method,

$$\frac{dy}{y} + Py = Q$$

$$\therefore P = 0.025, Q = 50(1 + \sin t)$$

$$I.F = e^{\int P dt}$$

$$I.F = e^{0.025t}$$

$$y \cdot I.F = \int Q \cdot I.F \cdot dt$$

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

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

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

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

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

Using integral - n by part.

$$u = e^{0.025t} \quad dv = \sin t$$

$$du = 0.025 e^{0.025t} \quad v = -\cos t$$

$$\therefore \int e^{0.025t} \sin t = e^{0.025t} (-\cos t) - \int (-\cos t) \cdot 0.025 e^{0.025t}$$

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

$$\therefore du = 0.025 e^{0.025t} \quad v = \sin t$$

$$u = e^{0.025t} \quad dv = \cos t$$

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

Let  $Q = \int_0^t e^{-0.025t} \sin t$

$\therefore Q = -e^{-0.025t} \cos t + 0.025 \int e^{-0.025t} \sin t - 0.025Q$

$Q + 6.25^{-4} Q = -e^{-0.025t} \cos t + 0.025 e^{-0.025t} \sin t$

$Q + 0.000625Q = -e^{-0.025t} \cos t + 0.025 e^{-0.025t} \sin t$

$1.000625Q = -e^{-0.025t} \cos t + 0.025 e^{-0.025t} \sin t$

$Q = \frac{-e^{-0.025t} \cos t + 0.025 e^{-0.025t} \sin t}{1.000625}$

$Q = \frac{-e^{-0.025t} \cos t + 0.025 e^{-0.025t} \sin t}{1.000625}$

$Q = \frac{-e^{-0.025t} \cos t + 0.025 e^{-0.025t} \sin t}{1.000625}$

$Q = \frac{-e^{-0.025t} \cos t + 0.025 e^{-0.025t} \sin t}{1.000625}$

$Q = \frac{-e^{-0.025t} \cos t + 0.025 e^{-0.025t} \sin t}{1.000625}$

$Q = \frac{-e^{-0.025t} \cos t + 0.025 e^{-0.025t} \sin t}{1.000625}$

$Q = \frac{-e^{-0.025t} \cos t + 0.025 e^{-0.025t} \sin t}{1.000625}$

$Q = \frac{-e^{-0.025t} \cos t + 0.025 e^{-0.025t} \sin t}{1.000625}$

$Q = \frac{-e^{-0.025t} \cos t + 0.025 e^{-0.025t} \sin t}{1.000625}$

$Q = \frac{-e^{-0.025t} \cos t + 0.025 e^{-0.025t} \sin t}{1.000625}$

$Q = \frac{-e^{-0.025t} \cos t + 0.025 e^{-0.025t} \sin t}{1.000625}$

$Q = \frac{-e^{-0.025t} \cos t + 0.025 e^{-0.025t} \sin t}{1.000625}$

$Q = \frac{-e^{-0.025t} \cos t + 0.025 e^{-0.025t} \sin t}{1.000625}$

$Q = \frac{-e^{-0.025t} \cos t + 0.025 e^{-0.025t} \sin t}{1.000625}$

$Q = \frac{-e^{-0.025t} \cos t + 0.025 e^{-0.025t} \sin t}{1.000625}$

$Q = \frac{-e^{-0.025t} \cos t + 0.025 e^{-0.025t} \sin t}{1.000625}$

$Q = \frac{-e^{-0.025t} \cos t + 0.025 e^{-0.025t} \sin t}{1.000625}$

$Q = \frac{-e^{-0.025t} \cos t + 0.025 e^{-0.025t} \sin t}{1.000625}$

$Q = \frac{-e^{-0.025t} \cos t + 0.025 e^{-0.025t} \sin t}{1.000625}$

$Q = \frac{-e^{-0.025t} \cos t + 0.025 e^{-0.025t} \sin t}{1.000625}$

$Q = \frac{-e^{-0.025t} \cos t + 0.025 e^{-0.025t} \sin t}{1.000625}$