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Civil Engineering
18/ENG03/001
ENG 282

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

$= 50(1+\sin t)\ lb/min$

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

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

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

$= -0.025y + 50 + 50\sin t$

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

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

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

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

$$\int \frac{dm}{[m-2000(1+\sin t)]} = -0.025\int dt$$

$$\ln[m-2000(1+\sin t)] = -0.025t + c$$

$$m-2000(1+\sin t) = e^{-0.025t} m_0$$

$$m = 2000(1+\sin t) = m_0 e^{-0.025t}$$

$$m = m_0 e^{-0.025t} + 2000(1+\sin t)$$

$t = 0$ min which is initial, $m = 150$

$$150 = m_0 e^{-0.025(0)} + 2000(1+\sin(0))$$

$$150 = m_0 + 2000$$

$$-m_0 = 2000 - 150$$

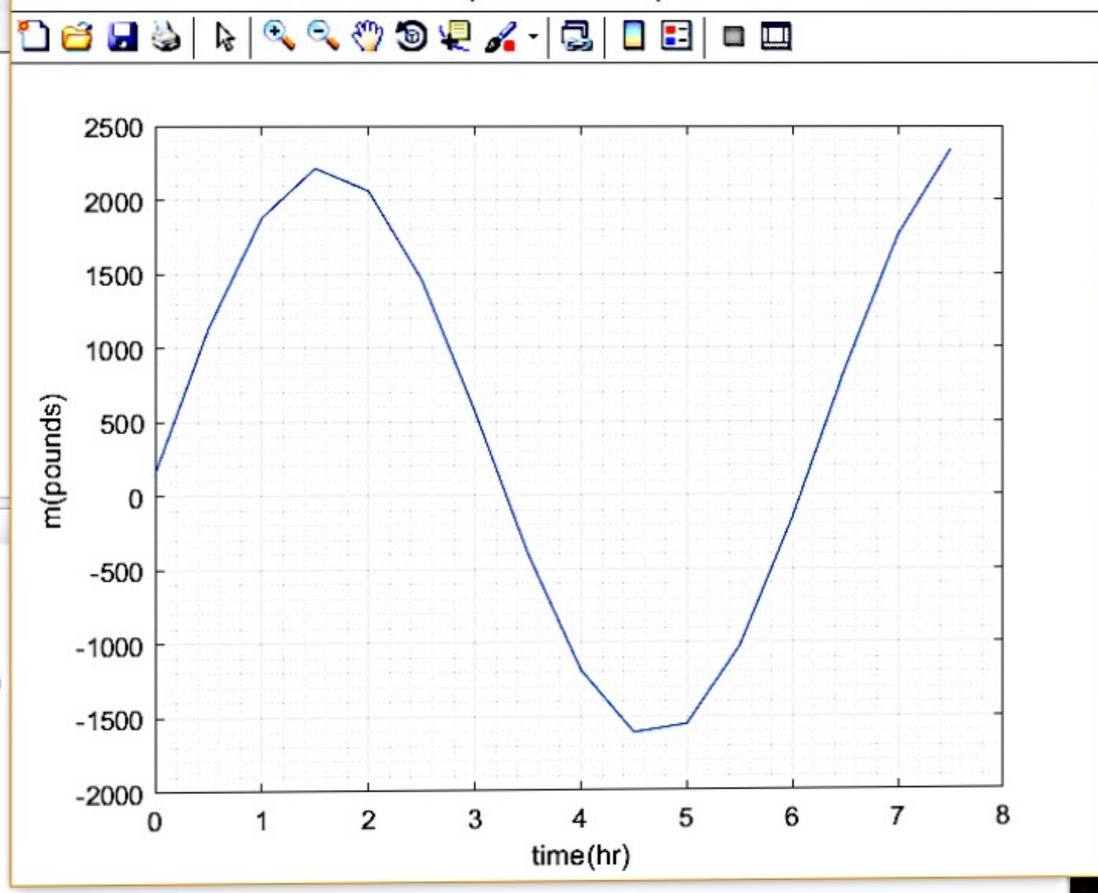
$$m_0 = -1850$$

ABUBAKARABDULLALHI.m

```
commandwindow
clear
clc
close all
syms m t
t = [0:0.5:7.5]
m = 2000*(1+sin(t)) - 1850*exp(-0.025*t)
plot(t,m)
xlabel('time(hr)')
ylabel('m(pounds)')
grid on
grid minor
```

Command Window

```
t =

         0    0.5000    1.0000    1.5000    2.0000    2.5000    3.0000    3.5000    4.0000


m =

   1.0e+03 *

    0.1500    1.1318    1.8786    2.2131    2.0588    1.4590    0.5659   -0.3966   -1.1876   -1.6082   -1.5505   -1.0234   -0.1511    0.8577    1.7610    2.34

fx >>
```



```
commandwindow
clear
clc
close all
ta=2:2:500
tb=1:2:500
y=(50/0.05)+((50/1.0025)*sin(tb))+(((50*0.05)/(1.0025))*cos(tb))-802.49*exp(-0.05*tb)
ym=1000-(800*exp(-0.05*ta))
yg=[y ym]
tg=[ta tb]
plot (tg,yg)
grid on
grid minor
xlabel ('V(litre)')
ylabel ('T(min)')
col_header={'t(min)','v(litre)'}
xlswrite('C:\Users\Seyitan\Documents\MATLAB\odevbesdata.xlsx',[tg(:),yg(:)],'veriler','A2')
xlswrite('C:\Users\Seyitan\Documents\MATLAB\odevbesdata.xlsx',col_header,'veriler','A1')
```