

Task
 Systems Ltd

10/1

b) Solve using I.T
 $\frac{dy}{dt} + y = 2 - \cos t$ Solving P.T.T
 $\int \frac{d}{dt}(ye^{t}) = \int (2 - \cos t)e^{t} dt$

$P = \frac{1}{40} \Delta = 50(1 + \sin t)$
 $I = e^{50t} \int (2 - \cos t) e^{-50t} dt = 1600e^{50t} \cos t - 40e^{50t} \sin t + 1600e^{50t} + C$

$\therefore I = e^{50t} (1600 \cos t - 40 \sin t + 1600) + C$

$m(t) = \int 50e^{50t} (1600 \cos t - 40 \sin t + 1600) dt = 1600 \int 50e^{50t} \cos t dt - 40 \int 50e^{50t} \sin t dt + 1600 \int 50e^{50t} dt$

Let $v = 50t \Rightarrow v = 50t \Rightarrow t = \frac{v}{50}$
 $\frac{dv}{dt} = 50$
 $dt = \frac{dv}{50}$

Subst back

Integrate by parts,
 $2000 \int e^{50t} \sin t dt$

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$\Rightarrow 2000 \int e^{50t} (\sin t + \cos t) dt - 40 \int e^{50t} (\sin t + \cos t) dt$
 $= 2000 \int e^{50t} (\sin t + \cos t) dt - 40 \int e^{50t} (\sin t + \cos t) dt$

Recall, $u = 50t$
 $= 2000 e^{50t} (\sin t + \cos t) - 80000 (40 e^{50t} \sin t + e^{50t} \cos t)$

$= 2000 e^{50t} (\sin t + \cos t) - 40 (40 e^{50t} \sin t + e^{50t} \cos t)$

$= 2000 e^{50t} (\sin t + \cos t) - 1600 e^{50t} \sin t - 40 e^{50t} \cos t$

$= \frac{2000 e^{50t}}{1601} (\sin t + \cos t + 1601) - \frac{1600 e^{50t}}{1601} \sin t - \frac{40 e^{50t}}{1601} \cos t$

$= m(t) = \frac{2000 (\sin t + \cos t + 1601) - 1600 \sin t - 40 \cos t}{1601}$

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	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
1	t [min]	V [l/min]																			
2	1	220,2629																			
3	2	218,1902																			
4	3	213,8603																			
5	4	211,6603																			
6	5	207,2009																			
7	6	203,0923																			
8	7	199,1523																			
9	8	193,0586																			
10	9	186,8922																			
11	10	180,0026																			
12	11	182,3228																			
13	12	180,2288																			
14	13	180,2820																			
15	14	183,2213																			
16	15	183,2820																			
17	16	182,8206																			
18	17	188,1676																			
19	18	187,2229																			
20	19	192,5485																			
21	20	183,1035																			
22	21	180,5413																			
23	22	179,2022																			
24	23	182,1679																			
25	24	170,1885																			
26	25	186,2615																			
27	26	188,0923																			
28	27	188,2043																			
29	28	183,2120																			
30	29	176,0983																			

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1 - commandwindow
2 - clear
3 - clc
4 - close all
5 - syms t
6 - y = (50/0.05)+((50/1.0025)*sin(t))+(((50*(0.05))/1.0025)*cos(t))
7 - ym = 1000-(800*exp(-0.05*t))
8 - oddValues = 1:2:500
9 - evenValues = 2:2:500
10 - ym = double(subs(y, oddValues))
11 - ymm = double(subs(ym, evenValues))
12 - totTime = 1:1:500
13 - timeTrans = totTime'
14 - c = reshape([ym, ymm], [1, 1])
15 - combVal = double(c)
16 - plot(totTime, c)
17 - grid on
18 - grid minor
19 - xlabel('T(min)'), ylabel('V(litre)')
20 - col_header = {'t(min)', 'V(Litre)'}
21 - xlswrite('odevbesdata.xlsx', col_header, 'veriler', 'A2')
22 - xlswrite('odevbesdata.xlsx', timeT, 'veriler', 'A3')
23 - xlswrite('odevbesdata.xlsx', combined, 'veriler', 'B2')

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Workspace

Name	Value
c	62750x1 double
combVal	62750x1 double

