

# ORIOLA MUNIRAT OMOBOLA,II

16/ENG07/024

## PETROLEUM ENGINEERING

### ENG 281 MID SEMESTER TEST

#### QUESTION B

commandwindow

clear

clc

syms t

d = 1.5\*exp(-0.75\*t) \* sin(0.85\*t) + 0.375\*t;

d = (3\*t)/8 + (3\*sin((17\*t)/20)\*exp(-(3\*t)/4))/2

tn = [0:0.01:2.5];

V = diff(d);

V = (51\*cos((17\*t)/20)\*exp(-(3\*t)/4))/40 - (9\*sin((17\*t)/20)\*exp(-(3\*t)/4))/8 + 3/8

Vn = subs(V,tn);

Vn =

[ 33/20, (51\*cos(17/2000)\*exp(-3/400))/40 - (9\*exp(-3/400)\*sin(17/2000))/8 + 3/8, (51\*cos(17/1000)\*exp(-3/200))/40 - (9\*exp(-3/200)\*sin(17/1000))/8 + 3/8, (51\*cos(51/2000)\*exp(-9/400))/40 - (9\*exp(-9/400)\*sin(51/2000))/8 + 3/8, (51\*cos(17/500)\*exp(-3/100))/40 - (9\*exp(-3/100)\*sin(17/500))/8 + 3/8, (51\*cos(17/400)\*exp(-3/80))/40 - (9\*exp(-3/80)\*sin(17/400))/8 + 3/8, (51\*cos(51/1000)\*exp(-9/200))/40 - (9\*exp(-9/200)\*sin(51/1000))/8 + 3/8, (51\*cos(119/2000)\*exp(-21/400))/40 - (9\*exp(-21/400)\*sin(119/2000))/8 + 3/8, (51\*cos(17/250)\*exp(-3/50))/40 - (9\*exp(-3/50)\*sin(17/250))/8 + 3/8, (51\*cos(153/2000)\*exp(-27/400))/40 - (9\*exp(-27/400)\*sin(153/2000))/8 + 3/8, (51\*cos(17/200)\*exp(-3/40))/40 - (9\*exp(-3/40)\*sin(17/200))/8 + 3/8, (51\*cos(187/2000)\*exp(-33/400))/40 - (9\*exp(-33/400)\*sin(187/2000))/8 + 3/8, (51\*cos(51/500)\*exp(-9/100))/40 - (9\*exp(-9/100)\*sin(51/500))/8 + 3/8, (51\*cos(221/2000)\*exp(-39/400))/40 - (9\*exp(-39/400)\*sin(221/2000))/8 + 3/8, (51\*cos(119/1000)\*exp(-21/200))/40 - (9\*exp(-21/200)\*sin(119/1000))/8 + 3/8, (51\*cos(51/400)\*exp(-9/80))/40 - (9\*exp(-9/80)\*sin(51/400))/8 + 3/8, (51\*cos(17/125)\*exp(-3/25))/40 - (9\*exp(-3/25)\*sin(17/125))/8 + 3/8, (51\*cos(289/2000)\*exp(-51/400))/40 - (9\*exp(-51/400)\*sin(289/2000))/8 + 3/8, (51\*cos(153/1000)\*exp(-27/200))/40 - (9\*exp(-27/200)\*sin(153/1000))/8 + 3/8, (51\*cos(323/2000)\*exp(-57/400))/40 - (9\*exp(-57/400)\*sin(323/2000))/8 + 3/8, (51\*cos(17/100)\*exp(-3/20))/40 - (9\*exp(-3/20)\*sin(17/100))/8 + 3/8, (51\*cos(357/2000)\*exp(-63/400))/40 - (9\*exp(-63/400)\*sin(357/2000))/8 + 3/8, (51\*cos(187/1000)\*exp(-33/200))/40 - (9\*exp(-33/200)\*sin(187/1000))/8 + 3/8, (51\*cos(391/2000)\*exp(-69/400))/40 - (9\*exp(-69/400)\*sin(391/2000))/8 + 3/8, (51\*cos(51/250)\*exp(-9/50))/40 - (9\*exp(-9/50)\*sin(51/250))/8 + 3/8, (51\*cos(17/80)\*exp(-3/16))/40 - (9\*exp(-3/16)\*sin(17/80))/8 + 3/8, (51\*cos(221/1000)\*exp(-39/200))/40 - (9\*exp(-39/200)\*sin(221/1000))/8 + 3/8, (51\*cos(459/2000)\*exp(-81/400))/40 - (9\*exp(-81/400)\*sin(459/2000))/8 + 3/8, (51\*cos(119/500)\*exp(-21/100))/40 - (9\*exp(-21/100)\*sin(119/500))/8 + 3/8, (51\*cos(493/2000)\*exp(-87/400))/40 - (9\*exp(-87/400)\*sin(493/2000))/8 + 3/8, (51\*cos(51/200)\*exp(-9/40))/40 - (9\*exp(-9/40)\*sin(51/200))/8 + 3/8, (51\*cos(527/2000)\*exp(-93/400))/40 - (9\*exp(-93/400)\*sin(527/2000))/8 + 3/8, (51\*cos(34/125)\*exp(-6/25))/40 - (9\*exp(-6/25)\*sin(34/125))/8 + 3/8, (51\*cos(561/2000)\*exp(-99/400))/40 - (9\*exp(-99/400)\*sin(561/2000))/8 + 3/8, (51\*cos(289/1000)\*exp(-51/200))/40 - (9\*exp(-51/200)\*sin(289/1000))/8 + 3/8, (51\*cos(119/400)\*exp(-21/80))/40

$$\begin{aligned}
& - (9 \cdot \exp(-21/80) \cdot \sin(119/400)) / 8 + 3/8, (51 \cdot \cos(153/500) \cdot \exp(-27/100)) / 40 - \\
& (9 \cdot \exp(-27/100) \cdot \sin(153/500)) / 8 + 3/8, (51 \cdot \cos(629/2000) \cdot \exp(-111/400)) / 40 - \\
& (9 \cdot \exp(-111/400) \cdot \sin(629/2000)) / 8 + 3/8, (51 \cdot \cos(323/1000) \cdot \exp(- \\
& 57/200)) / 40 - (9 \cdot \exp(-57/200) \cdot \sin(323/1000)) / 8 + 3/8, \\
& (51 \cdot \cos(663/2000) \cdot \exp(-117/400)) / 40 - (9 \cdot \exp(-117/400) \cdot \sin(663/2000)) / 8 + \\
& 3/8, (51 \cdot \cos(17/50) \cdot \exp(-3/10)) / 40 - (9 \cdot \exp(-3/10) \cdot \sin(17/50)) / 8 + 3/8, \\
& (51 \cdot \cos(697/2000) \cdot \exp(-123/400)) / 40 - (9 \cdot \exp(-123/400) \cdot \sin(697/2000)) / 8 + \\
& 3/8, (51 \cdot \cos(357/1000) \cdot \exp(-63/200)) / 40 - (9 \cdot \exp(-63/200) \cdot \sin(357/1000)) / 8 \\
& + 3/8, (51 \cdot \cos(731/2000) \cdot \exp(-129/400)) / 40 - (9 \cdot \exp(- \\
& 129/400) \cdot \sin(731/2000)) / 8 + 3/8, (51 \cdot \cos(187/500) \cdot \exp(-33/100)) / 40 - \\
& (9 \cdot \exp(-33/100) \cdot \sin(187/500)) / 8 + 3/8, (51 \cdot \cos(153/400) \cdot \exp(-27/80)) / 40 - \\
& (9 \cdot \exp(-27/80) \cdot \sin(153/400)) / 8 + 3/8, (51 \cdot \cos(391/1000) \cdot \exp(-69/200)) / 40 - \\
& (9 \cdot \exp(-69/200) \cdot \sin(391/1000)) / 8 + 3/8, (51 \cdot \cos(799/2000) \cdot \exp(-141/400)) / 40 \\
& - (9 \cdot \exp(-141/400) \cdot \sin(799/2000)) / 8 + 3/8, (51 \cdot \cos(51/125) \cdot \exp(-9/25)) / 40 - \\
& (9 \cdot \exp(-9/25) \cdot \sin(51/125)) / 8 + 3/8, (51 \cdot \cos(833/2000) \cdot \exp(-147/400)) / 40 - \\
& (9 \cdot \exp(-147/400) \cdot \sin(833/2000)) / 8 + 3/8, (51 \cdot \cos(17/40) \cdot \exp(-3/8)) / 40 - \\
& (9 \cdot \exp(-3/8) \cdot \sin(17/40)) / 8 + 3/8, (51 \cdot \cos(867/2000) \cdot \exp(-153/400)) / 40 - \\
& (9 \cdot \exp(-153/400) \cdot \sin(867/2000)) / 8 + 3/8, (51 \cdot \cos(221/500) \cdot \exp(-39/100)) / 40 \\
& - (9 \cdot \exp(-39/100) \cdot \sin(221/500)) / 8 + 3/8, (51 \cdot \cos(901/2000) \cdot \exp(- \\
& 159/400)) / 40 - (9 \cdot \exp(-159/400) \cdot \sin(901/2000)) / 8 + 3/8, \\
& (51 \cdot \cos(459/1000) \cdot \exp(-81/200)) / 40 - (9 \cdot \exp(-81/200) \cdot \sin(459/1000)) / 8 + \\
& 3/8, (51 \cdot \cos(187/400) \cdot \exp(-33/80)) / 40 - (9 \cdot \exp(-33/80) \cdot \sin(187/400)) / 8 + \\
& 3/8, (51 \cdot \cos(119/250) \cdot \exp(-21/50)) / 40 - (9 \cdot \exp(-21/50) \cdot \sin(119/250)) / 8 + \\
& 3/8, (51 \cdot \cos(969/2000) \cdot \exp(-171/400)) / 40 - (9 \cdot \exp(- \\
& 171/400) \cdot \sin(969/2000)) / 8 + 3/8, (51 \cdot \cos(493/1000) \cdot \exp(-87/200)) / 40 - \\
& (9 \cdot \exp(-87/200) \cdot \sin(493/1000)) / 8 + 3/8, (51 \cdot \cos(1003/2000) \cdot \exp(- \\
& 177/400)) / 40 - (9 \cdot \exp(-177/400) \cdot \sin(1003/2000)) / 8 + 3/8, \\
& (51 \cdot \cos(51/100) \cdot \exp(-9/20)) / 40 - (9 \cdot \exp(-9/20) \cdot \sin(51/100)) / 8 + 3/8, \\
& (51 \cdot \cos(1037/2000) \cdot \exp(-183/400)) / 40 - (9 \cdot \exp(-183/400) \cdot \sin(1037/2000)) / 8 + \\
& 3/8, (51 \cdot \cos(527/1000) \cdot \exp(-93/200)) / 40 - (9 \cdot \exp(-93/200) \cdot \sin(527/1000)) / 8 \\
& + 3/8, (51 \cdot \cos(1071/2000) \cdot \exp(-189/400)) / 40 - (9 \cdot \exp(- \\
& 189/400) \cdot \sin(1071/2000)) / 8 + 3/8, (51 \cdot \cos(68/125) \cdot \exp(-12/25)) / 40 - \\
& (9 \cdot \exp(-12/25) \cdot \sin(68/125)) / 8 + 3/8, (51 \cdot \cos(221/400) \cdot \exp(-39/80)) / 40 - \\
& (9 \cdot \exp(-39/80) \cdot \sin(221/400)) / 8 + 3/8, (51 \cdot \cos(561/1000) \cdot \exp(-99/200)) / 40 - \\
& (9 \cdot \exp(-99/200) \cdot \sin(561/1000)) / 8 + 3/8, (51 \cdot \cos(1139/2000) \cdot \exp(- \\
& 201/400)) / 40 - (9 \cdot \exp(-201/400) \cdot \sin(1139/2000)) / 8 + 3/8, \\
& (51 \cdot \cos(289/500) \cdot \exp(-51/100)) / 40 - (9 \cdot \exp(-51/100) \cdot \sin(289/500)) / 8 + 3/8, \\
& (51 \cdot \cos(1173/2000) \cdot \exp(-207/400)) / 40 - (9 \cdot \exp(-207/400) \cdot \sin(1173/2000)) / 8 + \\
& 3/8, (51 \cdot \cos(119/200) \cdot \exp(-21/40)) / 40 - (9 \cdot \exp(-21/40) \cdot \sin(119/200)) / 8 + \\
& 3/8, (51 \cdot \cos(1207/2000) \cdot \exp(-213/400)) / 40 - (9 \cdot \exp(- \\
& 213/400) \cdot \sin(1207/2000)) / 8 + 3/8, (51 \cdot \cos(153/250) \cdot \exp(-27/50)) / 40 - \\
& (9 \cdot \exp(-27/50) \cdot \sin(153/250)) / 8 + 3/8, (51 \cdot \cos(1241/2000) \cdot \exp(-219/400)) / 40 \\
& - (9 \cdot \exp(-219/400) \cdot \sin(1241/2000)) / 8 + 3/8, (51 \cdot \cos(629/1000) \cdot \exp(- \\
& 111/200)) / 40 - (9 \cdot \exp(-111/200) \cdot \sin(629/1000)) / 8 + 3/8, \\
& (51 \cdot \cos(51/80) \cdot \exp(-9/16)) / 40 - (9 \cdot \exp(-9/16) \cdot \sin(51/80)) / 8 + 3/8, \\
& (51 \cdot \cos(323/500) \cdot \exp(-57/100)) / 40 - (9 \cdot \exp(-57/100) \cdot \sin(323/500)) / 8 + 3/8, \\
& (51 \cdot \cos(1309/2000) \cdot \exp(-231/400)) / 40 - (9 \cdot \exp(-231/400) \cdot \sin(1309/2000)) / 8 + \\
& 3/8, (51 \cdot \cos(663/1000) \cdot \exp(-117/200)) / 40 - (9 \cdot \exp(- \\
& 117/200) \cdot \sin(663/1000)) / 8 + 3/8, (51 \cdot \cos(1343/2000) \cdot \exp(-237/400)) / 40 - \\
& (9 \cdot \exp(-237/400) \cdot \sin(1343/2000)) / 8 + 3/8, (51 \cdot \cos(17/25) \cdot \exp(-3/5)) / 40 - \\
& (9 \cdot \exp(-3/5) \cdot \sin(17/25)) / 8 + 3/8, (51 \cdot \cos(1377/2000) \cdot \exp(-243/400)) / 40 - \\
& (9 \cdot \exp(-243/400) \cdot \sin(1377/2000)) / 8 + 3/8, (51 \cdot \cos(697/1000) \cdot \exp(- \\
& 123/200)) / 40 - (9 \cdot \exp(-123/200) \cdot \sin(697/1000)) / 8 + 3/8, \\
& (51 \cdot \cos(1411/2000) \cdot \exp(-249/400)) / 40 - (9 \cdot \exp(-249/400) \cdot \sin(1411/2000)) / 8 + \\
& 3/8, (51 \cdot \cos(357/500) \cdot \exp(-63/100)) / 40 - (9 \cdot \exp(-63/100) \cdot \sin(357/500)) / 8 + \\
& 3/8, (51 \cdot \cos(289/400) \cdot \exp(-51/80)) / 40 - (9 \cdot \exp(-51/80) \cdot \sin(289/400)) / 8 + \\
& 3/8, (51 \cdot \cos(731/1000) \cdot \exp(-129/200)) / 40 - (9 \cdot \exp(- \\
& 129/200) \cdot \sin(731/1000)) / 8 + 3/8, (51 \cdot \cos(1479/2000) \cdot \exp(-261/400)) / 40 - \\
& (9 \cdot \exp(-261/400) \cdot \sin(1479/2000)) / 8 + 3/8, (51 \cdot \cos(187/250) \cdot \exp(-33/50)) / 40 \\
& - (9 \cdot \exp(-33/50) \cdot \sin(187/250)) / 8 + 3/8, (51 \cdot \cos(1513/2000) \cdot \exp(- \\
& 267/400)) / 40 - (9 \cdot \exp(-267/400) \cdot \sin(1513/2000)) / 8 + 3/8,
\end{aligned}$$

$(51 \cdot \cos(153/200) \cdot \exp(-27/40))/40 - (9 \cdot \exp(-27/40) \cdot \sin(153/200))/8 + 3/8,$   
 $(51 \cdot \cos(1547/2000) \cdot \exp(-273/400))/40 - (9 \cdot \exp(-273/400) \cdot \sin(1547/2000))/8 +$   
 $3/8, (51 \cdot \cos(391/500) \cdot \exp(-69/100))/40 - (9 \cdot \exp(-69/100) \cdot \sin(391/500))/8 +$   
 $3/8, (51 \cdot \cos(1581/2000) \cdot \exp(-279/400))/40 - (9 \cdot \exp(-$   
 $279/400) \cdot \sin(1581/2000))/8 + 3/8, (51 \cdot \cos(799/1000) \cdot \exp(-141/200))/40 -$   
 $(9 \cdot \exp(-141/200) \cdot \sin(799/1000))/8 + 3/8, (51 \cdot \cos(323/400) \cdot \exp(-57/80))/40 -$   
 $(9 \cdot \exp(-57/80) \cdot \sin(323/400))/8 + 3/8, (51 \cdot \cos(102/125) \cdot \exp(-18/25))/40 -$   
 $(9 \cdot \exp(-18/25) \cdot \sin(102/125))/8 + 3/8, (51 \cdot \cos(1649/2000) \cdot \exp(-291/400))/40$   
 $- (9 \cdot \exp(-291/400) \cdot \sin(1649/2000))/8 + 3/8, (51 \cdot \cos(833/1000) \cdot \exp(-$   
 $147/200))/40 - (9 \cdot \exp(-147/200) \cdot \sin(833/1000))/8 + 3/8,$   
 $(51 \cdot \cos(1683/2000) \cdot \exp(-297/400))/40 - (9 \cdot \exp(-297/400) \cdot \sin(1683/2000))/8 +$   
 $3/8, (51 \cdot \cos(17/20) \cdot \exp(-3/4))/40 - (9 \cdot \exp(-3/4) \cdot \sin(17/20))/8 + 3/8,$   
 $(51 \cdot \cos(1717/2000) \cdot \exp(-303/400))/40 - (9 \cdot \exp(-303/400) \cdot \sin(1717/2000))/8 +$   
 $3/8, (51 \cdot \cos(867/1000) \cdot \exp(-153/200))/40 - (9 \cdot \exp(-$   
 $153/200) \cdot \sin(867/1000))/8 + 3/8, (51 \cdot \cos(1751/2000) \cdot \exp(-309/400))/40 -$   
 $(9 \cdot \exp(-309/400) \cdot \sin(1751/2000))/8 + 3/8, (51 \cdot \cos(221/250) \cdot \exp(-39/50))/40$   
 $- (9 \cdot \exp(-39/50) \cdot \sin(221/250))/8 + 3/8, (51 \cdot \cos(357/400) \cdot \exp(-63/80))/40 -$   
 $(9 \cdot \exp(-63/80) \cdot \sin(357/400))/8 + 3/8, (51 \cdot \cos(901/1000) \cdot \exp(-159/200))/40 -$   
 $(9 \cdot \exp(-159/200) \cdot \sin(901/1000))/8 + 3/8, (51 \cdot \cos(1819/2000) \cdot \exp(-$   
 $321/400))/40 - (9 \cdot \exp(-321/400) \cdot \sin(1819/2000))/8 + 3/8,$   
 $(51 \cdot \cos(459/500) \cdot \exp(-81/100))/40 - (9 \cdot \exp(-81/100) \cdot \sin(459/500))/8 + 3/8,$   
 $(51 \cdot \cos(1853/2000) \cdot \exp(-327/400))/40 - (9 \cdot \exp(-327/400) \cdot \sin(1853/2000))/8 +$   
 $3/8, (51 \cdot \cos(187/200) \cdot \exp(-33/40))/40 - (9 \cdot \exp(-33/40) \cdot \sin(187/200))/8 +$   
 $3/8, (51 \cdot \cos(1887/2000) \cdot \exp(-333/400))/40 - (9 \cdot \exp(-$   
 $333/400) \cdot \sin(1887/2000))/8 + 3/8, (51 \cdot \cos(119/125) \cdot \exp(-21/25))/40 -$   
 $(9 \cdot \exp(-21/25) \cdot \sin(119/125))/8 + 3/8, (51 \cdot \cos(1921/2000) \cdot \exp(-339/400))/40$   
 $- (9 \cdot \exp(-339/400) \cdot \sin(1921/2000))/8 + 3/8, (51 \cdot \cos(969/1000) \cdot \exp(-$   
 $171/200))/40 - (9 \cdot \exp(-171/200) \cdot \sin(969/1000))/8 + 3/8,$   
 $(51 \cdot \cos(391/400) \cdot \exp(-69/80))/40 - (9 \cdot \exp(-69/80) \cdot \sin(391/400))/8 + 3/8,$   
 $(51 \cdot \cos(493/500) \cdot \exp(-87/100))/40 - (9 \cdot \exp(-87/100) \cdot \sin(493/500))/8 + 3/8,$   
 $(51 \cdot \cos(1989/2000) \cdot \exp(-351/400))/40 - (9 \cdot \exp(-351/400) \cdot \sin(1989/2000))/8 +$   
 $3/8, (51 \cdot \cos(1003/1000) \cdot \exp(-177/200))/40 - (9 \cdot \exp(-$   
 $177/200) \cdot \sin(1003/1000))/8 + 3/8, (51 \cdot \cos(2023/2000) \cdot \exp(-357/400))/40 -$   
 $(9 \cdot \exp(-357/400) \cdot \sin(2023/2000))/8 + 3/8, (51 \cdot \cos(51/50) \cdot \exp(-9/10))/40 -$   
 $(9 \cdot \exp(-9/10) \cdot \sin(51/50))/8 + 3/8, (51 \cdot \cos(2057/2000) \cdot \exp(-363/400))/40 -$   
 $(9 \cdot \exp(-363/400) \cdot \sin(2057/2000))/8 + 3/8, (51 \cdot \cos(1037/1000) \cdot \exp(-$   
 $183/200))/40 - (9 \cdot \exp(-183/200) \cdot \sin(1037/1000))/8 + 3/8,$   
 $(51 \cdot \cos(2091/2000) \cdot \exp(-369/400))/40 - (9 \cdot \exp(-369/400) \cdot \sin(2091/2000))/8 +$   
 $3/8, (51 \cdot \cos(527/500) \cdot \exp(-93/100))/40 - (9 \cdot \exp(-93/100) \cdot \sin(527/500))/8 +$   
 $3/8, (51 \cdot \cos(17/16) \cdot \exp(-15/16))/40 - (9 \cdot \exp(-15/16) \cdot \sin(17/16))/8 + 3/8,$   
 $(51 \cdot \cos(1071/1000) \cdot \exp(-189/200))/40 - (9 \cdot \exp(-189/200) \cdot \sin(1071/1000))/8 +$   
 $3/8, (51 \cdot \cos(2159/2000) \cdot \exp(-381/400))/40 - (9 \cdot \exp(-$   
 $381/400) \cdot \sin(2159/2000))/8 + 3/8, (51 \cdot \cos(136/125) \cdot \exp(-24/25))/40 -$   
 $(9 \cdot \exp(-24/25) \cdot \sin(136/125))/8 + 3/8, (51 \cdot \cos(2193/2000) \cdot \exp(-387/400))/40$   
 $- (9 \cdot \exp(-387/400) \cdot \sin(2193/2000))/8 + 3/8, (51 \cdot \cos(221/200) \cdot \exp(-$   
 $39/40))/40 - (9 \cdot \exp(-39/40) \cdot \sin(221/200))/8 + 3/8, (51 \cdot \cos(2227/2000) \cdot \exp(-$   
 $393/400))/40 - (9 \cdot \exp(-393/400) \cdot \sin(2227/2000))/8 + 3/8,$   
 $(51 \cdot \cos(561/500) \cdot \exp(-99/100))/40 - (9 \cdot \exp(-99/100) \cdot \sin(561/500))/8 + 3/8,$   
 $(51 \cdot \cos(2261/2000) \cdot \exp(-399/400))/40 - (9 \cdot \exp(-399/400) \cdot \sin(2261/2000))/8 +$   
 $3/8, (51 \cdot \cos(1139/1000) \cdot \exp(-201/200))/40 - (9 \cdot \exp(-$   
 $201/200) \cdot \sin(1139/1000))/8 + 3/8, (51 \cdot \cos(459/400) \cdot \exp(-81/80))/40 -$   
 $(9 \cdot \exp(-81/80) \cdot \sin(459/400))/8 + 3/8, (51 \cdot \cos(289/250) \cdot \exp(-51/50))/40 -$   
 $(9 \cdot \exp(-51/50) \cdot \sin(289/250))/8 + 3/8, (51 \cdot \cos(2329/2000) \cdot \exp(-411/400))/40$   
 $- (9 \cdot \exp(-411/400) \cdot \sin(2329/2000))/8 + 3/8, (51 \cdot \cos(1173/1000) \cdot \exp(-$   
 $207/200))/40 - (9 \cdot \exp(-207/200) \cdot \sin(1173/1000))/8 + 3/8,$   
 $(51 \cdot \cos(2363/2000) \cdot \exp(-417/400))/40 - (9 \cdot \exp(-417/400) \cdot \sin(2363/2000))/8 +$   
 $3/8, (51 \cdot \cos(119/100) \cdot \exp(-21/20))/40 - (9 \cdot \exp(-21/20) \cdot \sin(119/100))/8 +$   
 $3/8, (51 \cdot \cos(2397/2000) \cdot \exp(-423/400))/40 - (9 \cdot \exp(-$   
 $423/400) \cdot \sin(2397/2000))/8 + 3/8, (51 \cdot \cos(1207/1000) \cdot \exp(-213/200))/40 -$   
 $(9 \cdot \exp(-213/200) \cdot \sin(1207/1000))/8 + 3/8, (51 \cdot \cos(2431/2000) \cdot \exp(-$   
 $429/400))/40 - (9 \cdot \exp(-429/400) \cdot \sin(2431/2000))/8 + 3/8,$

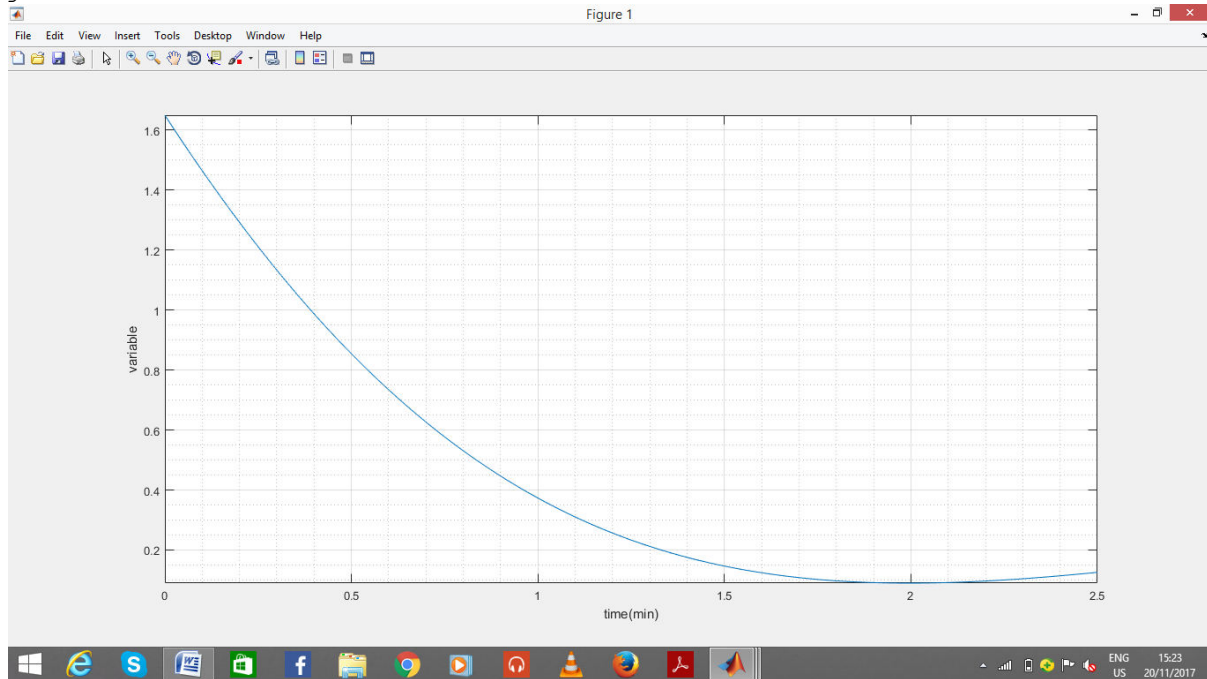
$(51 \cdot \cos(153/125) \cdot \exp(-27/25))/40 - (9 \cdot \exp(-27/25) \cdot \sin(153/125))/8 + 3/8,$   
 $(51 \cdot \cos(493/400) \cdot \exp(-87/80))/40 - (9 \cdot \exp(-87/80) \cdot \sin(493/400))/8 + 3/8,$   
 $(51 \cdot \cos(1241/1000) \cdot \exp(-219/200))/40 - (9 \cdot \exp(-219/200) \cdot \sin(1241/1000))/8 +$   
 $3/8, (51 \cdot \cos(2499/2000) \cdot \exp(-441/400))/40 - (9 \cdot \exp(-$   
 $441/400) \cdot \sin(2499/2000))/8 + 3/8, (51 \cdot \cos(629/500) \cdot \exp(-111/100))/40 -$   
 $(9 \cdot \exp(-111/100) \cdot \sin(629/500))/8 + 3/8, (51 \cdot \cos(2533/2000) \cdot \exp(-$   
 $447/400))/40 - (9 \cdot \exp(-447/400) \cdot \sin(2533/2000))/8 + 3/8,$   
 $(51 \cdot \cos(51/40) \cdot \exp(-9/8))/40 - (9 \cdot \exp(-9/8) \cdot \sin(51/40))/8 + 3/8,$   
 $(51 \cdot \cos(2567/2000) \cdot \exp(-453/400))/40 - (9 \cdot \exp(-453/400) \cdot \sin(2567/2000))/8 +$   
 $3/8, (51 \cdot \cos(323/250) \cdot \exp(-57/50))/40 - (9 \cdot \exp(-57/50) \cdot \sin(323/250))/8 +$   
 $3/8, (51 \cdot \cos(2601/2000) \cdot \exp(-459/400))/40 - (9 \cdot \exp(-$   
 $459/400) \cdot \sin(2601/2000))/8 + 3/8, (51 \cdot \cos(1309/1000) \cdot \exp(-231/200))/40 -$   
 $(9 \cdot \exp(-231/200) \cdot \sin(1309/1000))/8 + 3/8, (51 \cdot \cos(527/400) \cdot \exp(-93/80))/40$   
 $- (9 \cdot \exp(-93/80) \cdot \sin(527/400))/8 + 3/8, (51 \cdot \cos(663/500) \cdot \exp(-117/100))/40$   
 $- (9 \cdot \exp(-117/100) \cdot \sin(663/500))/8 + 3/8, (51 \cdot \cos(2669/2000) \cdot \exp(-$   
 $471/400))/40 - (9 \cdot \exp(-471/400) \cdot \sin(2669/2000))/8 + 3/8,$   
 $(51 \cdot \cos(1343/1000) \cdot \exp(-237/200))/40 - (9 \cdot \exp(-237/200) \cdot \sin(1343/1000))/8 +$   
 $3/8, (51 \cdot \cos(2703/2000) \cdot \exp(-477/400))/40 - (9 \cdot \exp(-$   
 $477/400) \cdot \sin(2703/2000))/8 + 3/8, (51 \cdot \cos(34/25) \cdot \exp(-6/5))/40 - (9 \cdot \exp(-$   
 $6/5) \cdot \sin(34/25))/8 + 3/8, (51 \cdot \cos(2737/2000) \cdot \exp(-483/400))/40 - (9 \cdot \exp(-$   
 $483/400) \cdot \sin(2737/2000))/8 + 3/8, (51 \cdot \cos(1377/1000) \cdot \exp(-243/200))/40 -$   
 $(9 \cdot \exp(-243/200) \cdot \sin(1377/1000))/8 + 3/8, (51 \cdot \cos(2771/2000) \cdot \exp(-$   
 $489/400))/40 - (9 \cdot \exp(-489/400) \cdot \sin(2771/2000))/8 + 3/8,$   
 $(51 \cdot \cos(697/500) \cdot \exp(-123/100))/40 - (9 \cdot \exp(-123/100) \cdot \sin(697/500))/8 +$   
 $3/8, (51 \cdot \cos(561/400) \cdot \exp(-99/80))/40 - (9 \cdot \exp(-99/80) \cdot \sin(561/400))/8 +$   
 $3/8, (51 \cdot \cos(1411/1000) \cdot \exp(-249/200))/40 - (9 \cdot \exp(-$   
 $249/200) \cdot \sin(1411/1000))/8 + 3/8, (51 \cdot \cos(2839/2000) \cdot \exp(-501/400))/40 -$   
 $(9 \cdot \exp(-501/400) \cdot \sin(2839/2000))/8 + 3/8, (51 \cdot \cos(357/250) \cdot \exp(-63/50))/40$   
 $- (9 \cdot \exp(-63/50) \cdot \sin(357/250))/8 + 3/8, (51 \cdot \cos(2873/2000) \cdot \exp(-$   
 $507/400))/40 - (9 \cdot \exp(-507/400) \cdot \sin(2873/2000))/8 + 3/8,$   
 $(51 \cdot \cos(289/200) \cdot \exp(-51/40))/40 - (9 \cdot \exp(-51/40) \cdot \sin(289/200))/8 + 3/8,$   
 $(51 \cdot \cos(2907/2000) \cdot \exp(-513/400))/40 - (9 \cdot \exp(-513/400) \cdot \sin(2907/2000))/8 +$   
 $3/8, (51 \cdot \cos(731/500) \cdot \exp(-129/100))/40 - (9 \cdot \exp(-129/100) \cdot \sin(731/500))/8$   
 $+ 3/8, (51 \cdot \cos(2941/2000) \cdot \exp(-519/400))/40 - (9 \cdot \exp(-$   
 $519/400) \cdot \sin(2941/2000))/8 + 3/8, (51 \cdot \cos(1479/1000) \cdot \exp(-261/200))/40 -$   
 $(9 \cdot \exp(-261/200) \cdot \sin(1479/1000))/8 + 3/8, (51 \cdot \cos(119/80) \cdot \exp(-21/16))/40 -$   
 $(9 \cdot \exp(-21/16) \cdot \sin(119/80))/8 + 3/8, (51 \cdot \cos(187/125) \cdot \exp(-33/25))/40 -$   
 $(9 \cdot \exp(-33/25) \cdot \sin(187/125))/8 + 3/8, (51 \cdot \cos(3009/2000) \cdot \exp(-531/400))/40$   
 $- (9 \cdot \exp(-531/400) \cdot \sin(3009/2000))/8 + 3/8, (51 \cdot \cos(1513/1000) \cdot \exp(-$   
 $267/200))/40 - (9 \cdot \exp(-267/200) \cdot \sin(1513/1000))/8 + 3/8,$   
 $(51 \cdot \cos(3043/2000) \cdot \exp(-537/400))/40 - (9 \cdot \exp(-537/400) \cdot \sin(3043/2000))/8 +$   
 $3/8, (51 \cdot \cos(153/100) \cdot \exp(-27/20))/40 - (9 \cdot \exp(-27/20) \cdot \sin(153/100))/8 +$   
 $3/8, (51 \cdot \cos(3077/2000) \cdot \exp(-543/400))/40 - (9 \cdot \exp(-$   
 $543/400) \cdot \sin(3077/2000))/8 + 3/8, (51 \cdot \cos(1547/1000) \cdot \exp(-273/200))/40 -$   
 $(9 \cdot \exp(-273/200) \cdot \sin(1547/1000))/8 + 3/8, (51 \cdot \cos(3111/2000) \cdot \exp(-$   
 $549/400))/40 - (9 \cdot \exp(-549/400) \cdot \sin(3111/2000))/8 + 3/8,$   
 $(51 \cdot \cos(391/250) \cdot \exp(-69/50))/40 - (9 \cdot \exp(-69/50) \cdot \sin(391/250))/8 + 3/8,$   
 $(51 \cdot \cos(629/400) \cdot \exp(-111/80))/40 - (9 \cdot \exp(-111/80) \cdot \sin(629/400))/8 + 3/8,$   
 $(51 \cdot \cos(1581/1000) \cdot \exp(-279/200))/40 - (9 \cdot \exp(-279/200) \cdot \sin(1581/1000))/8 +$   
 $3/8, (51 \cdot \cos(3179/2000) \cdot \exp(-561/400))/40 - (9 \cdot \exp(-$   
 $561/400) \cdot \sin(3179/2000))/8 + 3/8, (51 \cdot \cos(799/500) \cdot \exp(-141/100))/40 -$   
 $(9 \cdot \exp(-141/100) \cdot \sin(799/500))/8 + 3/8, (51 \cdot \cos(3213/2000) \cdot \exp(-$   
 $567/400))/40 - (9 \cdot \exp(-567/400) \cdot \sin(3213/2000))/8 + 3/8,$   
 $(51 \cdot \cos(323/200) \cdot \exp(-57/40))/40 - (9 \cdot \exp(-57/40) \cdot \sin(323/200))/8 + 3/8,$   
 $(51 \cdot \cos(3247/2000) \cdot \exp(-573/400))/40 - (9 \cdot \exp(-573/400) \cdot \sin(3247/2000))/8 +$   
 $3/8, (51 \cdot \cos(204/125) \cdot \exp(-36/25))/40 - (9 \cdot \exp(-36/25) \cdot \sin(204/125))/8 +$   
 $3/8, (51 \cdot \cos(3281/2000) \cdot \exp(-579/400))/40 - (9 \cdot \exp(-$   
 $579/400) \cdot \sin(3281/2000))/8 + 3/8, (51 \cdot \cos(1649/1000) \cdot \exp(-291/200))/40 -$   
 $(9 \cdot \exp(-291/200) \cdot \sin(1649/1000))/8 + 3/8, (51 \cdot \cos(663/400) \cdot \exp(-117/80))/40$   
 $- (9 \cdot \exp(-117/80) \cdot \sin(663/400))/8 + 3/8, (51 \cdot \cos(833/500) \cdot \exp(-147/100))/40$   
 $- (9 \cdot \exp(-147/100) \cdot \sin(833/500))/8 + 3/8, (51 \cdot \cos(3349/2000) \cdot \exp(-$

$$\begin{aligned}
& 591/400)/40 - (9*\exp(-591/400)*\sin(3349/2000))/8 + 3/8, \\
& (51*\cos(1683/1000)*\exp(-297/200))/40 - (9*\exp(-297/200)*\sin(1683/1000))/8 + \\
& 3/8, (51*\cos(3383/2000)*\exp(-597/400))/40 - (9*\exp(- \\
& 597/400)*\sin(3383/2000))/8 + 3/8, (51*\cos(17/10)*\exp(-3/2))/40 - (9*\exp(- \\
& 3/2)*\sin(17/10))/8 + 3/8, (51*\cos(3417/2000)*\exp(-603/400))/40 - (9*\exp(- \\
& 603/400)*\sin(3417/2000))/8 + 3/8, (51*\cos(1717/1000)*\exp(-303/200))/40 - \\
& (9*\exp(-303/200)*\sin(1717/1000))/8 + 3/8, (51*\cos(3451/2000)*\exp(- \\
& 609/400))/40 - (9*\exp(-609/400)*\sin(3451/2000))/8 + 3/8, \\
& (51*\cos(867/500)*\exp(-153/100))/40 - (9*\exp(-153/100)*\sin(867/500))/8 + \\
& 3/8, (51*\cos(697/400)*\exp(-123/80))/40 - (9*\exp(-123/80)*\sin(697/400))/8 + \\
& 3/8, (51*\cos(1751/1000)*\exp(-309/200))/40 - (9*\exp(- \\
& 309/200)*\sin(1751/1000))/8 + 3/8, (51*\cos(3519/2000)*\exp(-621/400))/40 - \\
& (9*\exp(-621/400)*\sin(3519/2000))/8 + 3/8, (51*\cos(221/125)*\exp(-39/25))/40 \\
& - (9*\exp(-39/25)*\sin(221/125))/8 + 3/8, (51*\cos(3553/2000)*\exp(- \\
& 627/400))/40 - (9*\exp(-627/400)*\sin(3553/2000))/8 + 3/8, \\
& (51*\cos(357/200)*\exp(-63/40))/40 - (9*\exp(-63/40)*\sin(357/200))/8 + 3/8, \\
& (51*\cos(3587/2000)*\exp(-633/400))/40 - (9*\exp(-633/400)*\sin(3587/2000))/8 + \\
& 3/8, (51*\cos(901/500)*\exp(-159/100))/40 - (9*\exp(-159/100)*\sin(901/500))/8 \\
& + 3/8, (51*\cos(3621/2000)*\exp(-639/400))/40 - (9*\exp(- \\
& 639/400)*\sin(3621/2000))/8 + 3/8, (51*\cos(1819/1000)*\exp(-321/200))/40 - \\
& (9*\exp(-321/200)*\sin(1819/1000))/8 + 3/8, (51*\cos(731/400)*\exp(-129/80))/40 \\
& - (9*\exp(-129/80)*\sin(731/400))/8 + 3/8, (51*\cos(459/250)*\exp(-81/50))/40 - \\
& (9*\exp(-81/50)*\sin(459/250))/8 + 3/8, (51*\cos(3689/2000)*\exp(-651/400))/40 \\
& - (9*\exp(-651/400)*\sin(3689/2000))/8 + 3/8, (51*\cos(1853/1000)*\exp(- \\
& 327/200))/40 - (9*\exp(-327/200)*\sin(1853/1000))/8 + 3/8, \\
& (51*\cos(3723/2000)*\exp(-657/400))/40 - (9*\exp(-657/400)*\sin(3723/2000))/8 + \\
& 3/8, (51*\cos(187/100)*\exp(-33/20))/40 - (9*\exp(-33/20)*\sin(187/100))/8 + \\
& 3/8, (51*\cos(3757/2000)*\exp(-663/400))/40 - (9*\exp(- \\
& 663/400)*\sin(3757/2000))/8 + 3/8, (51*\cos(1887/1000)*\exp(-333/200))/40 - \\
& (9*\exp(-333/200)*\sin(1887/1000))/8 + 3/8, (51*\cos(3791/2000)*\exp(- \\
& 669/400))/40 - (9*\exp(-669/400)*\sin(3791/2000))/8 + 3/8, \\
& (51*\cos(238/125)*\exp(-42/25))/40 - (9*\exp(-42/25)*\sin(238/125))/8 + 3/8, \\
& (51*\cos(153/80)*\exp(-27/16))/40 - (9*\exp(-27/16)*\sin(153/80))/8 + 3/8, \\
& (51*\cos(1921/1000)*\exp(-339/200))/40 - (9*\exp(-339/200)*\sin(1921/1000))/8 + \\
& 3/8, (51*\cos(3859/2000)*\exp(-681/400))/40 - (9*\exp(- \\
& 681/400)*\sin(3859/2000))/8 + 3/8, (51*\cos(969/500)*\exp(-171/100))/40 - \\
& (9*\exp(-171/100)*\sin(969/500))/8 + 3/8, (51*\cos(3893/2000)*\exp(- \\
& 687/400))/40 - (9*\exp(-687/400)*\sin(3893/2000))/8 + 3/8, \\
& (51*\cos(391/200)*\exp(-69/40))/40 - (9*\exp(-69/40)*\sin(391/200))/8 + 3/8, \\
& (51*\cos(3927/2000)*\exp(-693/400))/40 - (9*\exp(-693/400)*\sin(3927/2000))/8 + \\
& 3/8, (51*\cos(493/250)*\exp(-87/50))/40 - (9*\exp(-87/50)*\sin(493/250))/8 + \\
& 3/8, (51*\cos(3961/2000)*\exp(-699/400))/40 - (9*\exp(- \\
& 699/400)*\sin(3961/2000))/8 + 3/8, (51*\cos(1989/1000)*\exp(-351/200))/40 - \\
& (9*\exp(-351/200)*\sin(1989/1000))/8 + 3/8, (51*\cos(799/400)*\exp(-141/80))/40 \\
& - (9*\exp(-141/80)*\sin(799/400))/8 + 3/8, (51*\cos(1003/500)*\exp(- \\
& 177/100))/40 - (9*\exp(-177/100)*\sin(1003/500))/8 + 3/8, \\
& (51*\cos(4029/2000)*\exp(-711/400))/40 - (9*\exp(-711/400)*\sin(4029/2000))/8 + \\
& 3/8, (51*\cos(2023/1000)*\exp(-357/200))/40 - (9*\exp(- \\
& 357/200)*\sin(2023/1000))/8 + 3/8, (51*\cos(4063/2000)*\exp(-717/400))/40 - \\
& (9*\exp(-717/400)*\sin(4063/2000))/8 + 3/8, (51*\cos(51/25)*\exp(-9/5))/40 - \\
& (9*\exp(-9/5)*\sin(51/25))/8 + 3/8, (51*\cos(4097/2000)*\exp(-723/400))/40 - \\
& (9*\exp(-723/400)*\sin(4097/2000))/8 + 3/8, (51*\cos(2057/1000)*\exp(- \\
& 363/200))/40 - (9*\exp(-363/200)*\sin(2057/1000))/8 + 3/8, \\
& (51*\cos(4131/2000)*\exp(-729/400))/40 - (9*\exp(-729/400)*\sin(4131/2000))/8 + \\
& 3/8, (51*\cos(1037/500)*\exp(-183/100))/40 - (9*\exp(- \\
& 183/100)*\sin(1037/500))/8 + 3/8, (51*\cos(833/400)*\exp(-147/80))/40 - \\
& (9*\exp(-147/80)*\sin(833/400))/8 + 3/8, (51*\cos(2091/1000)*\exp(-369/200))/40 \\
& - (9*\exp(-369/200)*\sin(2091/1000))/8 + 3/8, (51*\cos(4199/2000)*\exp(- \\
& 741/400))/40 - (9*\exp(-741/400)*\sin(4199/2000))/8 + 3/8, \\
& (51*\cos(527/250)*\exp(-93/50))/40 - (9*\exp(-93/50)*\sin(527/250))/8 + 3/8,
\end{aligned}$$

```

(51*cos(4233/2000)*exp(-747/400))/40 - (9*exp(-747/400)*sin(4233/2000))/8 +
3/8, (51*cos(17/8)*exp(-15/8))/40 - (9*exp(-15/8)*sin(17/8))/8 + 3/8]
figure(1)
plot(tn,Vn);
xlabel('time(min)');
ylabel('variable');
axis tight
grid on
grid minor

```



```

A = diff(V);
A = - (153*cos((17*t)/20)*exp(-(3*t)/4))/80 - (6*sin((17*t)/20)*exp(-
(3*t)/4))/25

```

```

An = subs(A,tn);
An = [ -153/80, - (153*cos(17/2000)*exp(-3/400))/80 - (6*exp(-
3/400)*sin(17/2000))/25, - (153*cos(17/1000)*exp(-3/200))/80 - (6*exp(-
3/200)*sin(17/1000))/25, - (153*cos(51/2000)*exp(-9/400))/80 - (6*exp(-
9/400)*sin(51/2000))/25, - (153*cos(17/500)*exp(-3/100))/80 - (6*exp(-
3/100)*sin(17/500))/25, - (153*cos(17/400)*exp(-3/80))/80 - (6*exp(-
3/80)*sin(17/400))/25, - (153*cos(51/1000)*exp(-9/200))/80 - (6*exp(-
9/200)*sin(51/1000))/25, - (153*cos(119/2000)*exp(-21/400))/80 - (6*exp(-
21/400)*sin(119/2000))/25, - (153*cos(17/250)*exp(-3/50))/80 - (6*exp(-
3/50)*sin(17/250))/25, - (153*cos(153/2000)*exp(-27/400))/80 - (6*exp(-
27/400)*sin(153/2000))/25, - (153*cos(17/200)*exp(-3/40))/80 - (6*exp(-
3/40)*sin(17/200))/25, - (153*cos(187/2000)*exp(-33/400))/80 - (6*exp(-
33/400)*sin(187/2000))/25, - (153*cos(51/500)*exp(-9/100))/80 - (6*exp(-
9/100)*sin(51/500))/25, - (153*cos(221/2000)*exp(-39/400))/80 - (6*exp(-
39/400)*sin(221/2000))/25, - (153*cos(119/1000)*exp(-21/200))/80 - (6*exp(-
21/200)*sin(119/1000))/25, - (153*cos(51/400)*exp(-9/80))/80 - (6*exp(-
9/80)*sin(51/400))/25, - (153*cos(17/125)*exp(-3/25))/80 - (6*exp(-
3/25)*sin(17/125))/25, - (153*cos(289/2000)*exp(-51/400))/80 - (6*exp(-
51/400)*sin(289/2000))/25, - (153*cos(153/1000)*exp(-27/200))/80 - (6*exp(-
27/200)*sin(153/1000))/25, - (153*cos(323/2000)*exp(-57/400))/80 - (6*exp(-
57/400)*sin(323/2000))/25, - (153*cos(17/100)*exp(-3/20))/80 - (6*exp(-
3/20)*sin(17/100))/25, - (153*cos(357/2000)*exp(-63/400))/80 - (6*exp(-
63/400)*sin(357/2000))/25, - (153*cos(187/1000)*exp(-33/200))/80 - (6*exp(-
33/200)*sin(187/1000))/25, - (153*cos(391/2000)*exp(-69/400))/80 - (6*exp(-

```

$69/400) * \sin(391/2000)) / 25, - (153 * \cos(51/250) * \exp(-9/50)) / 80 - (6 * \exp(-9/50) * \sin(51/250)) / 25, - (153 * \cos(17/80) * \exp(-3/16)) / 80 - (6 * \exp(-3/16) * \sin(17/80)) / 25, - (153 * \cos(221/1000) * \exp(-39/200)) / 80 - (6 * \exp(-39/200) * \sin(221/1000)) / 25, - (153 * \cos(459/2000) * \exp(-81/400)) / 80 - (6 * \exp(-81/400) * \sin(459/2000)) / 25, - (153 * \cos(119/500) * \exp(-21/100)) / 80 - (6 * \exp(-21/100) * \sin(119/500)) / 25, - (153 * \cos(493/2000) * \exp(-87/400)) / 80 - (6 * \exp(-87/400) * \sin(493/2000)) / 25, - (153 * \cos(51/200) * \exp(-9/40)) / 80 - (6 * \exp(-9/40) * \sin(51/200)) / 25, - (153 * \cos(527/2000) * \exp(-93/400)) / 80 - (6 * \exp(-93/400) * \sin(527/2000)) / 25, - (153 * \cos(34/125) * \exp(-6/25)) / 80 - (6 * \exp(-6/25) * \sin(34/125)) / 25, - (153 * \cos(561/2000) * \exp(-99/400)) / 80 - (6 * \exp(-99/400) * \sin(561/2000)) / 25, - (153 * \cos(289/1000) * \exp(-51/200)) / 80 - (6 * \exp(-51/200) * \sin(289/1000)) / 25, - (153 * \cos(119/400) * \exp(-21/80)) / 80 - (6 * \exp(-21/80) * \sin(119/400)) / 25, - (153 * \cos(153/500) * \exp(-27/100)) / 80 - (6 * \exp(-27/100) * \sin(153/500)) / 25, - (153 * \cos(629/2000) * \exp(-111/400)) / 80 - (6 * \exp(-111/400) * \sin(629/2000)) / 25, - (153 * \cos(323/1000) * \exp(-57/200)) / 80 - (6 * \exp(-57/200) * \sin(323/1000)) / 25, - (153 * \cos(663/2000) * \exp(-117/400)) / 80 - (6 * \exp(-117/400) * \sin(663/2000)) / 25, - (153 * \cos(17/50) * \exp(-3/10)) / 80 - (6 * \exp(-3/10) * \sin(17/50)) / 25, - (153 * \cos(697/2000) * \exp(-123/400)) / 80 - (6 * \exp(-123/400) * \sin(697/2000)) / 25, - (153 * \cos(357/1000) * \exp(-63/200)) / 80 - (6 * \exp(-63/200) * \sin(357/1000)) / 25, - (153 * \cos(731/2000) * \exp(-129/400)) / 80 - (6 * \exp(-129/400) * \sin(731/2000)) / 25, - (153 * \cos(187/500) * \exp(-33/100)) / 80 - (6 * \exp(-33/100) * \sin(187/500)) / 25, - (153 * \cos(153/400) * \exp(-27/80)) / 80 - (6 * \exp(-27/80) * \sin(153/400)) / 25, - (153 * \cos(391/1000) * \exp(-69/200)) / 80 - (6 * \exp(-69/200) * \sin(391/1000)) / 25, - (153 * \cos(799/2000) * \exp(-141/400)) / 80 - (6 * \exp(-141/400) * \sin(799/2000)) / 25, - (153 * \cos(51/125) * \exp(-9/25)) / 80 - (6 * \exp(-9/25) * \sin(51/125)) / 25, - (153 * \cos(833/2000) * \exp(-147/400)) / 80 - (6 * \exp(-147/400) * \sin(833/2000)) / 25, - (153 * \cos(17/40) * \exp(-3/8)) / 80 - (6 * \exp(-3/8) * \sin(17/40)) / 25, - (153 * \cos(867/2000) * \exp(-153/400)) / 80 - (6 * \exp(-153/400) * \sin(867/2000)) / 25, - (153 * \cos(221/500) * \exp(-39/100)) / 80 - (6 * \exp(-39/100) * \sin(221/500)) / 25, - (153 * \cos(901/2000) * \exp(-159/400)) / 80 - (6 * \exp(-159/400) * \sin(901/2000)) / 25, - (153 * \cos(459/1000) * \exp(-81/200)) / 80 - (6 * \exp(-81/200) * \sin(459/1000)) / 25, - (153 * \cos(187/400) * \exp(-33/80)) / 80 - (6 * \exp(-33/80) * \sin(187/400)) / 25, - (153 * \cos(119/250) * \exp(-21/50)) / 80 - (6 * \exp(-21/50) * \sin(119/250)) / 25, - (153 * \cos(969/2000) * \exp(-171/400)) / 80 - (6 * \exp(-171/400) * \sin(969/2000)) / 25, - (153 * \cos(493/1000) * \exp(-87/200)) / 80 - (6 * \exp(-87/200) * \sin(493/1000)) / 25, - (153 * \cos(1003/2000) * \exp(-177/400)) / 80 - (6 * \exp(-177/400) * \sin(1003/2000)) / 25, - (153 * \cos(51/100) * \exp(-9/20)) / 80 - (6 * \exp(-9/20) * \sin(51/100)) / 25, - (153 * \cos(1037/2000) * \exp(-183/400)) / 80 - (6 * \exp(-183/400) * \sin(1037/2000)) / 25, - (153 * \cos(527/1000) * \exp(-93/200)) / 80 - (6 * \exp(-93/200) * \sin(527/1000)) / 25, - (153 * \cos(1071/2000) * \exp(-189/400)) / 80 - (6 * \exp(-189/400) * \sin(1071/2000)) / 25, - (153 * \cos(68/125) * \exp(-12/25)) / 80 - (6 * \exp(-12/25) * \sin(68/125)) / 25, - (153 * \cos(221/400) * \exp(-39/80)) / 80 - (6 * \exp(-39/80) * \sin(221/400)) / 25, - (153 * \cos(561/1000) * \exp(-99/200)) / 80 - (6 * \exp(-99/200) * \sin(561/1000)) / 25, - (153 * \cos(1139/2000) * \exp(-201/400)) / 80 - (6 * \exp(-201/400) * \sin(1139/2000)) / 25, - (153 * \cos(289/500) * \exp(-51/100)) / 80 - (6 * \exp(-51/100) * \sin(289/500)) / 25, - (153 * \cos(1173/2000) * \exp(-207/400)) / 80 - (6 * \exp(-207/400) * \sin(1173/2000)) / 25, - (153 * \cos(119/200) * \exp(-21/40)) / 80 - (6 * \exp(-21/40) * \sin(119/200)) / 25, - (153 * \cos(1207/2000) * \exp(-213/400)) / 80 - (6 * \exp(-213/400) * \sin(1207/2000)) / 25, - (153 * \cos(153/250) * \exp(-27/50)) / 80 - (6 * \exp(-27/50) * \sin(153/250)) / 25, - (153 * \cos(1241/2000) * \exp(-219/400)) / 80 - (6 * \exp(-219/400) * \sin(1241/2000)) / 25, - (153 * \cos(629/1000) * \exp(-111/200)) / 80 - (6 * \exp(-111/200) * \sin(629/1000)) / 25, - (153 * \cos(51/80) * \exp(-9/16)) / 80 - (6 * \exp(-9/16) * \sin(51/80)) / 25, - (153 * \cos(323/500) * \exp(-57/100)) / 80 - (6 * \exp(-57/100) * \sin(323/500)) / 25, - (153 * \cos(1309/2000) * \exp(-231/400)) / 80 - (6 * \exp(-231/400) * \sin(1309/2000)) / 25, - (153 * \cos(663/1000) * \exp(-117/200)) / 80 - (6 * \exp(-117/200) * \sin(663/1000)) / 25, - (153 * \cos(1343/2000) * \exp(-237/400)) / 80 - (6 * \exp(-237/400) * \sin(1343/2000)) / 25, - (153 * \cos(17/25) * \exp(-3/5)) / 80 - (6 * \exp(-3/5) * \sin(17/25)) / 25, - (153 * \cos(1377/2000) * \exp(-243/400)) / 80 - (6 * \exp(-243/400) * \sin(1377/2000)) / 25, - (153 * \cos(697/1000) * \exp(-123/200)) / 80 - (6 * \exp(-123/200) * \sin(697/1000)) / 25,$

$$\begin{aligned}
& - (153 \cos(1411/2000) \exp(-249/400)) / 80 - (6 \exp(-249/400) \sin(1411/2000)) / 25, - (153 \cos(357/500) \exp(-63/100)) / 80 - \\
& (6 \exp(-63/100) \sin(357/500)) / 25, - (153 \cos(289/400) \exp(-51/80)) / 80 - \\
& (6 \exp(-51/80) \sin(289/400)) / 25, - (153 \cos(731/1000) \exp(-129/200)) / 80 - \\
& (6 \exp(-129/200) \sin(731/1000)) / 25, - (153 \cos(1479/2000) \exp(-261/400)) / 80 - \\
& (6 \exp(-261/400) \sin(1479/2000)) / 25, - (153 \cos(187/250) \exp(-33/50)) / 80 - \\
& (6 \exp(-33/50) \sin(187/250)) / 25, - (153 \cos(1513/2000) \exp(-267/400)) / 80 - \\
& (6 \exp(-267/400) \sin(1513/2000)) / 25, - (153 \cos(153/200) \exp(-27/40)) / 80 - \\
& (6 \exp(-27/40) \sin(153/200)) / 25, - (153 \cos(1547/2000) \exp(-273/400)) / 80 - \\
& (6 \exp(-273/400) \sin(1547/2000)) / 25, - (153 \cos(391/500) \exp(-69/100)) / 80 - \\
& (6 \exp(-69/100) \sin(391/500)) / 25, - (153 \cos(1581/2000) \exp(-279/400)) / 80 - \\
& (6 \exp(-279/400) \sin(1581/2000)) / 25, - (153 \cos(799/1000) \exp(-141/200)) / 80 - \\
& (6 \exp(-141/200) \sin(799/1000)) / 25, - (153 \cos(323/400) \exp(-57/80)) / 80 - \\
& (6 \exp(-57/80) \sin(323/400)) / 25, - (153 \cos(102/125) \exp(-18/25)) / 80 - \\
& (6 \exp(-18/25) \sin(102/125)) / 25, - (153 \cos(1649/2000) \exp(-291/400)) / 80 - \\
& (6 \exp(-291/400) \sin(1649/2000)) / 25, - (153 \cos(833/1000) \exp(-147/200)) / 80 - \\
& (6 \exp(-147/200) \sin(833/1000)) / 25, - (153 \cos(1683/2000) \exp(-297/400)) / 80 - \\
& (6 \exp(-297/400) \sin(1683/2000)) / 25, - (153 \cos(17/20) \exp(-3/4)) / 80 - \\
& (6 \exp(-3/4) \sin(17/20)) / 25, - (153 \cos(1717/2000) \exp(-303/400)) / 80 - \\
& (6 \exp(-303/400) \sin(1717/2000)) / 25, - (153 \cos(867/1000) \exp(-153/200)) / 80 - \\
& (6 \exp(-153/200) \sin(867/1000)) / 25, - (153 \cos(1751/2000) \exp(-309/400)) / 80 - \\
& (6 \exp(-309/400) \sin(1751/2000)) / 25, - (153 \cos(221/250) \exp(-39/50)) / 80 - \\
& (6 \exp(-39/50) \sin(221/250)) / 25, - (153 \cos(357/400) \exp(-63/80)) / 80 - \\
& (6 \exp(-63/80) \sin(357/400)) / 25, - (153 \cos(901/1000) \exp(-159/200)) / 80 - \\
& (6 \exp(-159/200) \sin(901/1000)) / 25, - (153 \cos(1819/2000) \exp(-321/400)) / 80 - \\
& (6 \exp(-321/400) \sin(1819/2000)) / 25, - (153 \cos(459/500) \exp(-81/100)) / 80 - \\
& (6 \exp(-81/100) \sin(459/500)) / 25, - (153 \cos(1853/2000) \exp(-327/400)) / 80 - \\
& (6 \exp(-327/400) \sin(1853/2000)) / 25, - (153 \cos(187/200) \exp(-33/40)) / 80 - \\
& (6 \exp(-33/40) \sin(187/200)) / 25, - (153 \cos(1887/2000) \exp(-333/400)) / 80 - \\
& (6 \exp(-333/400) \sin(1887/2000)) / 25, - (153 \cos(119/125) \exp(-21/25)) / 80 - \\
& (6 \exp(-21/25) \sin(119/125)) / 25, - (153 \cos(1921/2000) \exp(-339/400)) / 80 - \\
& (6 \exp(-339/400) \sin(1921/2000)) / 25, - (153 \cos(969/1000) \exp(-171/200)) / 80 - \\
& (6 \exp(-171/200) \sin(969/1000)) / 25, - (153 \cos(391/400) \exp(-69/80)) / 80 - \\
& (6 \exp(-69/80) \sin(391/400)) / 25, - (153 \cos(493/500) \exp(-87/100)) / 80 - \\
& (6 \exp(-87/100) \sin(493/500)) / 25, - (153 \cos(1989/2000) \exp(-351/400)) / 80 - \\
& (6 \exp(-351/400) \sin(1989/2000)) / 25, - (153 \cos(1003/1000) \exp(-177/200)) / 80 - \\
& (6 \exp(-177/200) \sin(1003/1000)) / 25, - (153 \cos(2023/2000) \exp(-357/400)) / 80 - \\
& (6 \exp(-357/400) \sin(2023/2000)) / 25, - (153 \cos(51/50) \exp(-9/10)) / 80 - \\
& (6 \exp(-9/10) \sin(51/50)) / 25, - (153 \cos(2057/2000) \exp(-363/400)) / 80 - \\
& (6 \exp(-363/400) \sin(2057/2000)) / 25, - (153 \cos(1037/1000) \exp(-183/200)) / 80 - \\
& (6 \exp(-183/200) \sin(1037/1000)) / 25, - (153 \cos(2091/2000) \exp(-369/400)) / 80 - \\
& (6 \exp(-369/400) \sin(2091/2000)) / 25, - (153 \cos(527/500) \exp(-93/100)) / 80 - \\
& (6 \exp(-93/100) \sin(527/500)) / 25, - (153 \cos(17/16) \exp(-15/16)) / 80 - \\
& (6 \exp(-15/16) \sin(17/16)) / 25, - (153 \cos(1071/1000) \exp(-189/200)) / 80 - \\
& (6 \exp(-189/200) \sin(1071/1000)) / 25, - (153 \cos(2159/2000) \exp(-381/400)) / 80 - \\
& (6 \exp(-381/400) \sin(2159/2000)) / 25, - (153 \cos(136/125) \exp(-24/25)) / 80 - \\
& (6 \exp(-24/25) \sin(136/125)) / 25, - (153 \cos(2193/2000) \exp(-387/400)) / 80 - \\
& (6 \exp(-387/400) \sin(2193/2000)) / 25, - (153 \cos(221/200) \exp(-39/40)) / 80 - \\
& (6 \exp(-39/40) \sin(221/200)) / 25, - (153 \cos(2227/2000) \exp(-393/400)) / 80 - \\
& (6 \exp(-393/400) \sin(2227/2000)) / 25, - (153 \cos(561/500) \exp(-99/100)) / 80 - \\
& (6 \exp(-99/100) \sin(561/500)) / 25, - (153 \cos(2261/2000) \exp(-399/400)) / 80 - \\
& (6 \exp(-399/400) \sin(2261/2000)) / 25, - (153 \cos(1139/1000) \exp(-201/200)) / 80 - \\
& (6 \exp(-201/200) \sin(1139/1000)) / 25, - (153 \cos(459/400) \exp(-81/80)) / 80 - \\
& (6 \exp(-81/80) \sin(459/400)) / 25, - (153 \cos(289/250) \exp(-51/50)) / 80 - \\
& (6 \exp(-51/50) \sin(289/250)) / 25, - (153 \cos(2329/2000) \exp(-411/400)) / 80 - \\
& (6 \exp(-411/400) \sin(2329/2000)) / 25, - (153 \cos(1173/1000) \exp(-207/200)) / 80 -
\end{aligned}$$

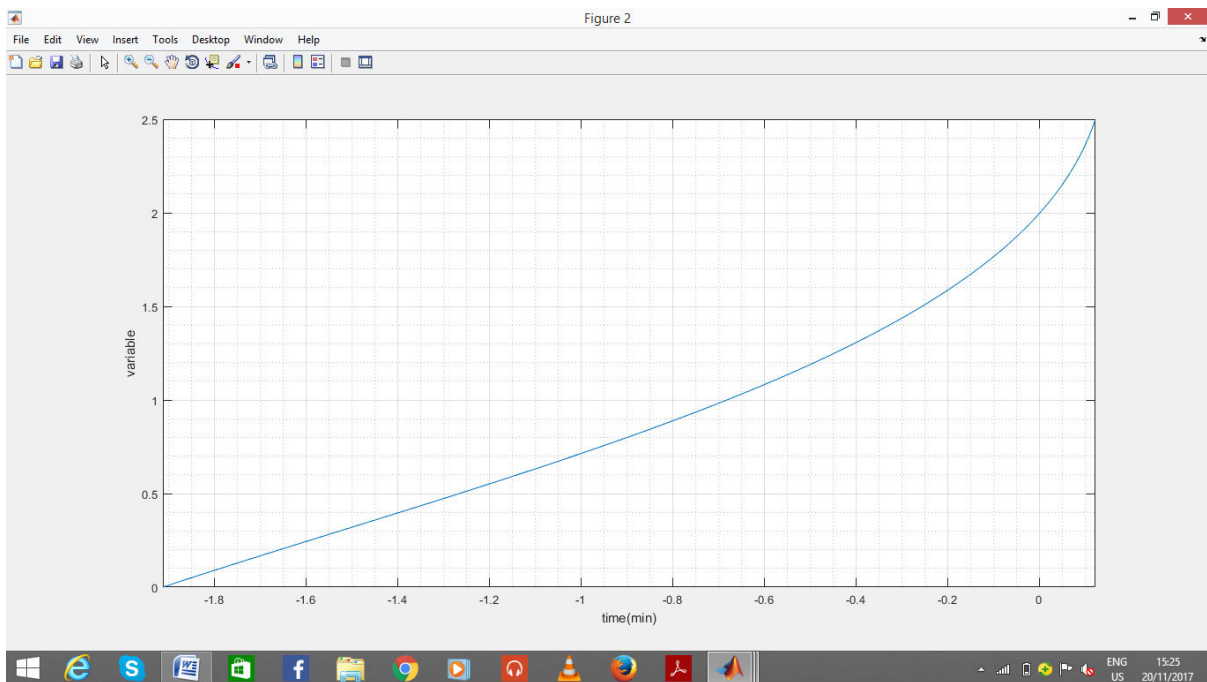


$(6*\exp(-207/200)*\sin(1173/1000))/25, - (153*\cos(2363/2000)*\exp(-417/400))/80 - (6*\exp(-417/400)*\sin(2363/2000))/25, -$   
 $(153*\cos(119/100)*\exp(-21/20))/80 - (6*\exp(-21/20)*\sin(119/100))/25, -$   
 $(153*\cos(2397/2000)*\exp(-423/400))/80 - (6*\exp(-423/400)*\sin(2397/2000))/25, - (153*\cos(1207/1000)*\exp(-213/200))/80 -$   
 $(6*\exp(-213/200)*\sin(1207/1000))/25, - (153*\cos(2431/2000)*\exp(-429/400))/80 - (6*\exp(-429/400)*\sin(2431/2000))/25, -$   
 $(153*\cos(153/125)*\exp(-27/25))/80 - (6*\exp(-27/25)*\sin(153/125))/25, -$   
 $(153*\cos(493/400)*\exp(-87/80))/80 - (6*\exp(-87/80)*\sin(493/400))/25, -$   
 $(153*\cos(1241/1000)*\exp(-219/200))/80 - (6*\exp(-219/200)*\sin(1241/1000))/25, - (153*\cos(2499/2000)*\exp(-441/400))/80 -$   
 $(6*\exp(-441/400)*\sin(2499/2000))/25, - (153*\cos(629/500)*\exp(-111/100))/80 -$   
 $(6*\exp(-111/100)*\sin(629/500))/25, - (153*\cos(2533/2000)*\exp(-447/400))/80 - (6*\exp(-447/400)*\sin(2533/2000))/25, - (153*\cos(51/40)*\exp(-9/8))/80 -$   
 $(6*\exp(-9/8)*\sin(51/40))/25, - (153*\cos(2567/2000)*\exp(-453/400))/80 - (6*\exp(-453/400)*\sin(2567/2000))/25, -$   
 $(153*\cos(323/250)*\exp(-57/50))/80 - (6*\exp(-57/50)*\sin(323/250))/25, -$   
 $(153*\cos(2601/2000)*\exp(-459/400))/80 - (6*\exp(-459/400)*\sin(2601/2000))/25, - (153*\cos(1309/1000)*\exp(-231/200))/80 -$   
 $(6*\exp(-231/200)*\sin(1309/1000))/25, - (153*\cos(527/400)*\exp(-93/80))/80 -$   
 $(6*\exp(-93/80)*\sin(527/400))/25, - (153*\cos(663/500)*\exp(-117/100))/80 -$   
 $(6*\exp(-117/100)*\sin(663/500))/25, - (153*\cos(2669/2000)*\exp(-471/400))/80 -$   
 $(6*\exp(-471/400)*\sin(2669/2000))/25, - (153*\cos(1343/1000)*\exp(-237/200))/80 - (6*\exp(-237/200)*\sin(1343/1000))/25, -$   
 $(153*\cos(2703/2000)*\exp(-477/400))/80 - (6*\exp(-477/400)*\sin(2703/2000))/25, - (153*\cos(34/25)*\exp(-6/5))/80 - (6*\exp(-6/5)*\sin(34/25))/25, -$   
 $(153*\cos(2737/2000)*\exp(-483/400))/80 - (6*\exp(-483/400)*\sin(2737/2000))/25, - (153*\cos(1377/1000)*\exp(-243/200))/80 -$   
 $(6*\exp(-243/200)*\sin(1377/1000))/25, - (153*\cos(2771/2000)*\exp(-489/400))/80 - (6*\exp(-489/400)*\sin(2771/2000))/25, -$   
 $(153*\cos(697/500)*\exp(-123/100))/80 - (6*\exp(-123/100)*\sin(697/500))/25, -$   
 $(153*\cos(561/400)*\exp(-99/80))/80 - (6*\exp(-99/80)*\sin(561/400))/25, -$   
 $(153*\cos(1411/1000)*\exp(-249/200))/80 - (6*\exp(-249/200)*\sin(1411/1000))/25, - (153*\cos(2839/2000)*\exp(-501/400))/80 -$   
 $(6*\exp(-501/400)*\sin(2839/2000))/25, - (153*\cos(357/250)*\exp(-63/50))/80 -$   
 $(6*\exp(-63/50)*\sin(357/250))/25, - (153*\cos(2873/2000)*\exp(-507/400))/80 -$   
 $(6*\exp(-507/400)*\sin(2873/2000))/25, - (153*\cos(289/200)*\exp(-51/40))/80 -$   
 $(6*\exp(-51/40)*\sin(289/200))/25, - (153*\cos(2907/2000)*\exp(-513/400))/80 -$   
 $(6*\exp(-513/400)*\sin(2907/2000))/25, - (153*\cos(731/500)*\exp(-129/100))/80 -$   
 $(6*\exp(-129/100)*\sin(731/500))/25, - (153*\cos(2941/2000)*\exp(-519/400))/80 - (6*\exp(-519/400)*\sin(2941/2000))/25, -$   
 $(153*\cos(1479/1000)*\exp(-261/200))/80 - (6*\exp(-261/200)*\sin(1479/1000))/25, - (153*\cos(119/80)*\exp(-21/16))/80 - (6*\exp(-21/16)*\sin(119/80))/25, -$   
 $(153*\cos(187/125)*\exp(-33/25))/80 - (6*\exp(-33/25)*\sin(187/125))/25, - (153*\cos(3009/2000)*\exp(-531/400))/80 - (6*\exp(-531/400)*\sin(3009/2000))/25, -$   
 $(153*\cos(1513/1000)*\exp(-267/200))/80 - (6*\exp(-267/200)*\sin(1513/1000))/25, - (153*\cos(3043/2000)*\exp(-537/400))/80 - (6*\exp(-537/400)*\sin(3043/2000))/25, -$   
 $(153*\cos(153/100)*\exp(-27/20))/80 - (6*\exp(-27/20)*\sin(153/100))/25, -$   
 $(153*\cos(3077/2000)*\exp(-543/400))/80 - (6*\exp(-543/400)*\sin(3077/2000))/25, - (153*\cos(1547/1000)*\exp(-273/200))/80 -$   
 $(6*\exp(-273/200)*\sin(1547/1000))/25, - (153*\cos(3111/2000)*\exp(-549/400))/80 - (6*\exp(-549/400)*\sin(3111/2000))/25, -$   
 $(153*\cos(391/250)*\exp(-69/50))/80 - (6*\exp(-69/50)*\sin(391/250))/25, -$   
 $(153*\cos(629/400)*\exp(-111/80))/80 - (6*\exp(-111/80)*\sin(629/400))/25, -$   
 $(153*\cos(1581/1000)*\exp(-279/200))/80 - (6*\exp(-279/200)*\sin(1581/1000))/25, - (153*\cos(3179/2000)*\exp(-561/400))/80 -$   
 $(6*\exp(-561/400)*\sin(3179/2000))/25, - (153*\cos(799/500)*\exp(-141/100))/80 -$   
 $(6*\exp(-141/100)*\sin(799/500))/25, - (153*\cos(3213/2000)*\exp(-567/400))/80 - (6*\exp(-567/400)*\sin(3213/2000))/25, -$   
 $(153*\cos(323/200)*\exp(-57/40))/80 - (6*\exp(-57/40)*\sin(323/200))/25, -$

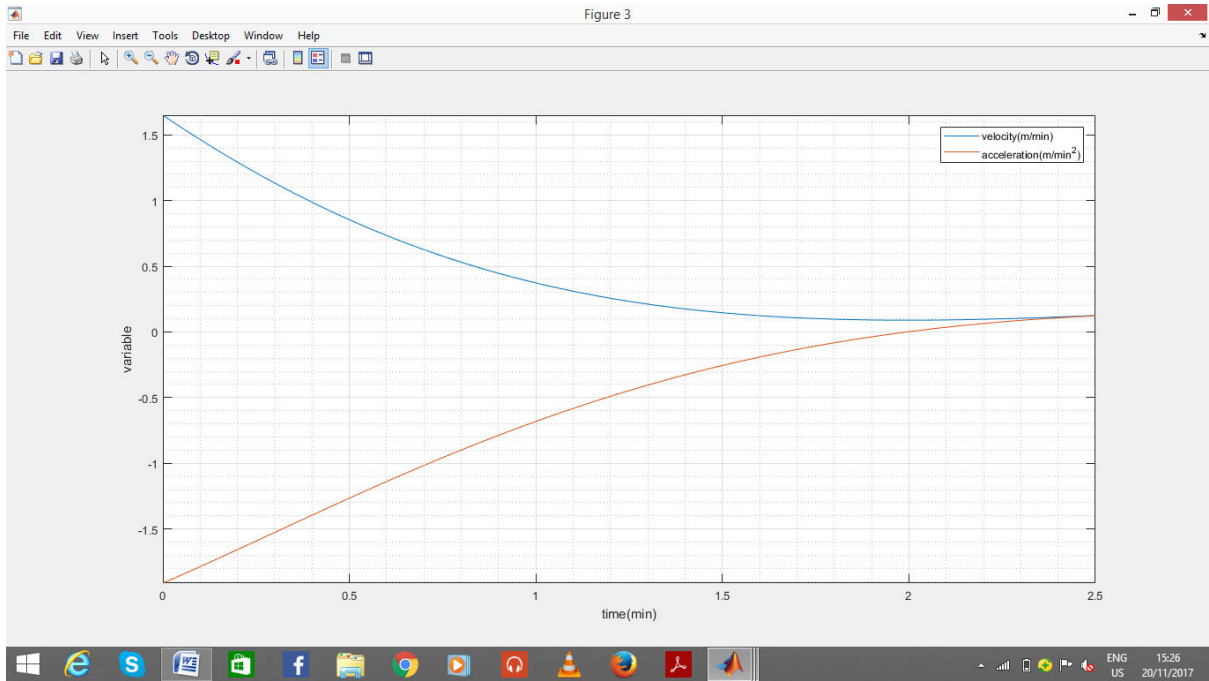
$(153 \cdot \cos(3247/2000) \cdot \exp(-573/400))/80 - (6 \cdot \exp(-573/400) \cdot \sin(3247/2000))/25, - (153 \cdot \cos(204/125) \cdot \exp(-36/25))/80 - (6 \cdot \exp(-36/25) \cdot \sin(204/125))/25, - (153 \cdot \cos(3281/2000) \cdot \exp(-579/400))/80 - (6 \cdot \exp(-579/400) \cdot \sin(3281/2000))/25, - (153 \cdot \cos(1649/1000) \cdot \exp(-291/200))/80 - (6 \cdot \exp(-291/200) \cdot \sin(1649/1000))/25, - (153 \cdot \cos(663/400) \cdot \exp(-117/80))/80 - (6 \cdot \exp(-117/80) \cdot \sin(663/400))/25, - (153 \cdot \cos(833/500) \cdot \exp(-147/100))/80 - (6 \cdot \exp(-147/100) \cdot \sin(833/500))/25, - (153 \cdot \cos(3349/2000) \cdot \exp(-591/400))/80 - (6 \cdot \exp(-591/400) \cdot \sin(3349/2000))/25, - (153 \cdot \cos(1683/1000) \cdot \exp(-297/200))/80 - (6 \cdot \exp(-297/200) \cdot \sin(1683/1000))/25, - (153 \cdot \cos(3383/2000) \cdot \exp(-597/400))/80 - (6 \cdot \exp(-597/400) \cdot \sin(3383/2000))/25, - (153 \cdot \cos(17/10) \cdot \exp(-3/2))/80 - (6 \cdot \exp(-3/2) \cdot \sin(17/10))/25, - (153 \cdot \cos(3417/2000) \cdot \exp(-603/400))/80 - (6 \cdot \exp(-603/400) \cdot \sin(3417/2000))/25, - (153 \cdot \cos(1717/1000) \cdot \exp(-303/200))/80 - (6 \cdot \exp(-303/200) \cdot \sin(1717/1000))/25, - (153 \cdot \cos(3451/2000) \cdot \exp(-609/400))/80 - (6 \cdot \exp(-609/400) \cdot \sin(3451/2000))/25, - (153 \cdot \cos(867/500) \cdot \exp(-153/100))/80 - (6 \cdot \exp(-153/100) \cdot \sin(867/500))/25, - (153 \cdot \cos(697/400) \cdot \exp(-123/80))/80 - (6 \cdot \exp(-123/80) \cdot \sin(697/400))/25, - (153 \cdot \cos(1751/1000) \cdot \exp(-309/200))/80 - (6 \cdot \exp(-309/200) \cdot \sin(1751/1000))/25, - (153 \cdot \cos(3519/2000) \cdot \exp(-621/400))/80 - (6 \cdot \exp(-621/400) \cdot \sin(3519/2000))/25, - (153 \cdot \cos(221/125) \cdot \exp(-39/25))/80 - (6 \cdot \exp(-39/25) \cdot \sin(221/125))/25, - (153 \cdot \cos(3553/2000) \cdot \exp(-627/400))/80 - (6 \cdot \exp(-627/400) \cdot \sin(3553/2000))/25, - (153 \cdot \cos(357/200) \cdot \exp(-63/40))/80 - (6 \cdot \exp(-63/40) \cdot \sin(357/200))/25, - (153 \cdot \cos(3587/2000) \cdot \exp(-633/400))/80 - (6 \cdot \exp(-633/400) \cdot \sin(3587/2000))/25, - (153 \cdot \cos(901/500) \cdot \exp(-159/100))/80 - (6 \cdot \exp(-159/100) \cdot \sin(901/500))/25, - (153 \cdot \cos(3621/2000) \cdot \exp(-639/400))/80 - (6 \cdot \exp(-639/400) \cdot \sin(3621/2000))/25, - (153 \cdot \cos(1819/1000) \cdot \exp(-321/200))/80 - (6 \cdot \exp(-321/200) \cdot \sin(1819/1000))/25, - (153 \cdot \cos(731/400) \cdot \exp(-129/80))/80 - (6 \cdot \exp(-129/80) \cdot \sin(731/400))/25, - (153 \cdot \cos(459/250) \cdot \exp(-81/50))/80 - (6 \cdot \exp(-81/50) \cdot \sin(459/250))/25, - (153 \cdot \cos(3689/2000) \cdot \exp(-651/400))/80 - (6 \cdot \exp(-651/400) \cdot \sin(3689/2000))/25, - (153 \cdot \cos(1853/1000) \cdot \exp(-327/200))/80 - (6 \cdot \exp(-327/200) \cdot \sin(1853/1000))/25, - (153 \cdot \cos(3723/2000) \cdot \exp(-657/400))/80 - (6 \cdot \exp(-657/400) \cdot \sin(3723/2000))/25, - (153 \cdot \cos(187/100) \cdot \exp(-33/20))/80 - (6 \cdot \exp(-33/20) \cdot \sin(187/100))/25, - (153 \cdot \cos(3757/2000) \cdot \exp(-663/400))/80 - (6 \cdot \exp(-663/400) \cdot \sin(3757/2000))/25, - (153 \cdot \cos(1887/1000) \cdot \exp(-333/200))/80 - (6 \cdot \exp(-333/200) \cdot \sin(1887/1000))/25, - (153 \cdot \cos(3791/2000) \cdot \exp(-669/400))/80 - (6 \cdot \exp(-669/400) \cdot \sin(3791/2000))/25, - (153 \cdot \cos(238/125) \cdot \exp(-42/25))/80 - (6 \cdot \exp(-42/25) \cdot \sin(238/125))/25, - (153 \cdot \cos(153/80) \cdot \exp(-27/16))/80 - (6 \cdot \exp(-27/16) \cdot \sin(153/80))/25, - (153 \cdot \cos(1921/1000) \cdot \exp(-339/200))/80 - (6 \cdot \exp(-339/200) \cdot \sin(1921/1000))/25, - (153 \cdot \cos(3859/2000) \cdot \exp(-681/400))/80 - (6 \cdot \exp(-681/400) \cdot \sin(3859/2000))/25, - (153 \cdot \cos(969/500) \cdot \exp(-171/100))/80 - (6 \cdot \exp(-171/100) \cdot \sin(969/500))/25, - (153 \cdot \cos(3893/2000) \cdot \exp(-687/400))/80 - (6 \cdot \exp(-687/400) \cdot \sin(3893/2000))/25, - (153 \cdot \cos(391/200) \cdot \exp(-69/40))/80 - (6 \cdot \exp(-69/40) \cdot \sin(391/200))/25, - (153 \cdot \cos(3927/2000) \cdot \exp(-693/400))/80 - (6 \cdot \exp(-693/400) \cdot \sin(3927/2000))/25, - (153 \cdot \cos(493/250) \cdot \exp(-87/50))/80 - (6 \cdot \exp(-87/50) \cdot \sin(493/250))/25, - (153 \cdot \cos(3961/2000) \cdot \exp(-699/400))/80 - (6 \cdot \exp(-699/400) \cdot \sin(3961/2000))/25, - (153 \cdot \cos(1989/1000) \cdot \exp(-351/200))/80 - (6 \cdot \exp(-351/200) \cdot \sin(1989/1000))/25, - (153 \cdot \cos(799/400) \cdot \exp(-141/80))/80 - (6 \cdot \exp(-141/80) \cdot \sin(799/400))/25, - (153 \cdot \cos(1003/500) \cdot \exp(-177/100))/80 - (6 \cdot \exp(-177/100) \cdot \sin(1003/500))/25, - (153 \cdot \cos(4029/2000) \cdot \exp(-711/400))/80 - (6 \cdot \exp(-711/400) \cdot \sin(4029/2000))/25, - (153 \cdot \cos(2023/1000) \cdot \exp(-357/200))/80 - (6 \cdot \exp(-357/200) \cdot \sin(2023/1000))/25, - (153 \cdot \cos(4063/2000) \cdot \exp(-717/400))/80 - (6 \cdot \exp(-717/400) \cdot \sin(4063/2000))/25, - (153 \cdot \cos(51/25) \cdot \exp(-9/5))/80 - (6 \cdot \exp(-9/5) \cdot \sin(51/25))/25, - (153 \cdot \cos(4097/2000) \cdot \exp(-723/400))/80 - (6 \cdot \exp(-723/400) \cdot \sin(4097/2000))/25, - (153 \cdot \cos(2057/1000) \cdot \exp(-363/200))/80 - (6 \cdot \exp(-363/200) \cdot \sin(2057/1000))/25, - (153 \cdot \cos(4131/2000) \cdot \exp(-729/400))/80 - (6 \cdot \exp(-729/400) \cdot \sin(4131/2000))/25, -$

```
(153*cos(1037/500)*exp(-183/100))/80 - (6*exp(-183/100)*sin(1037/500))/25,
- (153*cos(833/400)*exp(-147/80))/80 - (6*exp(-147/80)*sin(833/400))/25, -
(153*cos(2091/1000)*exp(-369/200))/80 - (6*exp(-
369/200)*sin(2091/1000))/25, - (153*cos(4199/2000)*exp(-741/400))/80 -
(6*exp(-741/400)*sin(4199/2000))/25, - (153*cos(527/250)*exp(-93/50))/80 -
(6*exp(-93/50)*sin(527/250))/25, - (153*cos(4233/2000)*exp(-747/400))/80 -
(6*exp(-747/400)*sin(4233/2000))/25, - (153*cos(17/8)*exp(-15/8))/80 -
(6*exp(-15/8)*sin(17/8))/25]
```

```
figure(2)
plot(An,tn);
xlabel('time (min)');
ylabel('variable');
axis tight
grid on
grid minor
```



```
figure(3)
plot(tn,Vn,tn,An);
xlabel('time (min)')
ylabel('variable')
axis tight
grid on
grid minor
legend('velocity (m/min)', 'acceleration (m/min^2)');
```



**QUESTION A**

```
commandwindow
```

```
clear
```

```
clc
```

```
F = [ 0 10 4 -2; -3 -17 1 2; 1 1 1 0; 8 -34 16 -10];
```

```
F =
```

```

0    10    4    -2
-3   -17    1    2
1     1    1    0
8   -34   16   -10
```

```
B = [-4; 2; 6; 4];
```

```
B =
```

```

-4
 2
 6
 4
```

```
D = inv(F);
```

```
D =
```

```

-0.1786  -0.1020   0.5714   0.0153
 0.0357  -0.0153   0.0357  -0.0102
 0.1429   0.1173   0.3929  -0.0051
-0.0357   0.1582   0.9643  -0.0612
```

```
X = D * B;
```

```
X =
```

```

4.0000
-0.0000
2.0000
6.0000
```

### QUESTION C

```
commandwindow
clear
clc
syms x
y = 5*sin(5*x)^5;
    y = 5*sin(5*x)^5

yint = int(y);
    yint = (2*cos(5*x)^3)/3 - cos(5*x) - cos(5*x)^5/5

yintd = int(y,0,pi);
    yintd = 16/15

yintdd = double(yintd);
    yintdd = 1.0667
```