AJALA EMMANUEL ENIOLA

16/ENG05/006

MECHATRONICS

1. commandwindow

clear

clc

A=[0,10,4,-2;-3,-17,1,2;1,1,1,0;8,-34,16,-10]

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

X= A^-1 \*B

OUTPUT

A =

0 10 4 -2

-3 -17 1 2

1 1 1 0

8 -34 16 -10

B =

-4

2

6

4

X =

4.0000

-0.0000

2.0000

6.0000

2. commandwindow

clear

clc

syms x

y=5\*(sin(5\*x))^5

ys=pi\*y^2

v=int(ys,0,pi)

vint= double(v)

OUTPUT

y =

5\*sin(5\*x)^5

ys =

25\*pi\*sin(5\*x)^10

v =

(1575\*pi^2)/256

vint =

60.7212

3. commandwindow

clear

clc

close all

syms t

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

tn= [0:0.01:2.5]

v= diff(d)

vn= subs(v,tn)

figure (1)

plot(tn,vn)

grid on

grid minor

axis tight

xlabel('time(min)')

ylabel('velocity(m/min)')

a=diff(v)

an= subs(a,tn)

figure (2)

plot(tn,an)

xlabel('time(min)')

ylabel('acceleration(m/min^2)')

grid on

grid minor

axis tight

figure (3)

plot(tn,vn,tn,an)

grid on

grid minor

axis tight

xlabel('time(min)')

ylabel('variable')

legend('velocity(m/min)','acceleration(m/min^2)','location','best')

OUTPUTS:







d =

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

tn =

Columns 1 through 16

0 0.0100 0.0200 0.0300 0.0400 0.0500 0.0600 0.0700 0.0800 0.0900 0.1000 0.1100 0.1200 0.1300 0.1400 0.1500

Columns 17 through 32

0.1600 0.1700 0.1800 0.1900 0.2000 0.2100 0.2200 0.2300 0.2400 0.2500 0.2600 0.2700 0.2800 0.2900 0.3000 0.3100

Columns 33 through 48

0.3200 0.3300 0.3400 0.3500 0.3600 0.3700 0.3800 0.3900 0.4000 0.4100 0.4200 0.4300 0.4400 0.4500 0.4600 0.4700

Columns 49 through 64

0.4800 0.4900 0.5000 0.5100 0.5200 0.5300 0.5400 0.5500 0.5600 0.5700 0.5800 0.5900 0.6000 0.6100 0.6200 0.6300

Columns 65 through 80

0.6400 0.6500 0.6600 0.6700 0.6800 0.6900 0.7000 0.7100 0.7200 0.7300 0.7400 0.7500 0.7600 0.7700 0.7800 0.7900

Columns 81 through 96

0.8000 0.8100 0.8200 0.8300 0.8400 0.8500 0.8600 0.8700 0.8800 0.8900 0.9000 0.9100 0.9200 0.9300 0.9400 0.9500

Columns 97 through 112

0.9600 0.9700 0.9800 0.9900 1.0000 1.0100 1.0200 1.0300 1.0400 1.0500 1.0600 1.0700 1.0800 1.0900 1.1000 1.1100

Columns 113 through 128

1.1200 1.1300 1.1400 1.1500 1.1600 1.1700 1.1800 1.1900 1.2000 1.2100 1.2200 1.2300 1.2400 1.2500 1.2600 1.2700

Columns 129 through 144

1.2800 1.2900 1.3000 1.3100 1.3200 1.3300 1.3400 1.3500 1.3600 1.3700 1.3800 1.3900 1.4000 1.4100 1.4200 1.4300

Columns 145 through 160

1.4400 1.4500 1.4600 1.4700 1.4800 1.4900 1.5000 1.5100 1.5200 1.5300 1.5400 1.5500 1.5600 1.5700 1.5800 1.5900

Columns 161 through 176

1.6000 1.6100 1.6200 1.6300 1.6400 1.6500 1.6600 1.6700 1.6800 1.6900 1.7000 1.7100 1.7200 1.7300 1.7400 1.7500

Columns 177 through 192

1.7600 1.7700 1.7800 1.7900 1.8000 1.8100 1.8200 1.8300 1.8400 1.8500 1.8600 1.8700 1.8800 1.8900 1.9000 1.9100

Columns 193 through 208

1.9200 1.9300 1.9400 1.9500 1.9600 1.9700 1.9800 1.9900 2.0000 2.0100 2.0200 2.0300 2.0400 2.0500 2.0600 2.0700

Columns 209 through 224

2.0800 2.0900 2.1000 2.1100 2.1200 2.1300 2.1400 2.1500 2.1600 2.1700 2.1800 2.1900 2.2000 2.2100 2.2200 2.2300

Columns 225 through 240

2.2400 2.2500 2.2600 2.2700 2.2800 2.2900 2.3000 2.3100 2.3200 2.3300 2.3400 2.3500 2.3600 2.3700 2.3800 2.3900

Columns 241 through 251

2.4000 2.4100 2.4200 2.4300 2.4400 2.4500 2.4600 2.4700 2.4800 2.4900 2.5000

v =

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

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 - (9\*exp(-21/80)\*sin(119/400))/8 + 3/8, (51\*cos(153/500)\*exp(-27/100))/40 - (9\*exp(-27/100)\*sin(153/500))/8 + 3/8, (51\*cos(629/2000)\*exp(-111/400))/40 - (9\*exp(-111/400)\*sin(629/2000))/8 + 3/8, (51\*cos(323/1000)\*exp(-57/200))/40 - (9\*exp(-57/200)\*sin(323/1000))/8 + 3/8, (51\*cos(663/2000)\*exp(-117/400))/40 - (9\*exp(-117/400)\*sin(663/2000))/8 + 3/8, (51\*cos(17/50)\*exp(-3/10))/40 - (9\*exp(-3/10)\*sin(17/50))/8 + 3/8, (51\*cos(697/2000)\*exp(-123/400))/40 - (9\*exp(-123/400)\*sin(697/2000))/8 + 3/8, (51\*cos(357/1000)\*exp(-63/200))/40 - (9\*exp(-63/200)\*sin(357/1000))/8 + 3/8, (51\*cos(731/2000)\*exp(-129/400))/40 - (9\*exp(-129/400)\*sin(731/2000))/8 + 3/8, (51\*cos(187/500)\*exp(-33/100))/40 - (9\*exp(-33/100)\*sin(187/500))/8 + 3/8, (51\*cos(153/400)\*exp(-27/80))/40 - (9\*exp(-27/80)\*sin(153/400))/8 + 3/8, (51\*cos(391/1000)\*exp(-69/200))/40 - (9\*exp(-69/200)\*sin(391/1000))/8 + 3/8, (51\*cos(799/2000)\*exp(-141/400))/40 - (9\*exp(-141/400)\*sin(799/2000))/8 + 3/8, (51\*cos(51/125)\*exp(-9/25))/40 - (9\*exp(-9/25)\*sin(51/125))/8 + 3/8, (51\*cos(833/2000)\*exp(-147/400))/40 - (9\*exp(-147/400)\*sin(833/2000))/8 + 3/8, (51\*cos(17/40)\*exp(-3/8))/40 - (9\*exp(-3/8)\*sin(17/40))/8 + 3/8, (51\*cos(867/2000)\*exp(-153/400))/40 - (9\*exp(-153/400)\*sin(867/2000))/8 + 3/8, (51\*cos(221/500)\*exp(-39/100))/40 - (9\*exp(-39/100)\*sin(221/500))/8 + 3/8, (51\*cos(901/2000)\*exp(-159/400))/40 - (9\*exp(-159/400)\*sin(901/2000))/8 + 3/8, (51\*cos(459/1000)\*exp(-81/200))/40 - (9\*exp(-81/200)\*sin(459/1000))/8 + 3/8, (51\*cos(187/400)\*exp(-33/80))/40 - (9\*exp(-33/80)\*sin(187/400))/8 + 3/8, (51\*cos(119/250)\*exp(-21/50))/40 - (9\*exp(-21/50)\*sin(119/250))/8 + 3/8, (51\*cos(969/2000)\*exp(-171/400))/40 - (9\*exp(-171/400)\*sin(969/2000))/8 + 3/8, (51\*cos(493/1000)\*exp(-87/200))/40 - (9\*exp(-87/200)\*sin(493/1000))/8 + 3/8, (51\*cos(1003/2000)\*exp(-177/400))/40 - (9\*exp(-177/400)\*sin(1003/2000))/8 + 3/8, (51\*cos(51/100)\*exp(-9/20))/40 - (9\*exp(-9/20)\*sin(51/100))/8 + 3/8, (51\*cos(1037/2000)\*exp(-183/400))/40 - (9\*exp(-183/400)\*sin(1037/2000))/8 + 3/8, (51\*cos(527/1000)\*exp(-93/200))/40 - (9\*exp(-93/200)\*sin(527/1000))/8 + 3/8, (51\*cos(1071/2000)\*exp(-189/400))/40 - (9\*exp(-189/400)\*sin(1071/2000))/8 + 3/8, (51\*cos(68/125)\*exp(-12/25))/40 - (9\*exp(-12/25)\*sin(68/125))/8 + 3/8, (51\*cos(221/400)\*exp(-39/80))/40 - (9\*exp(-39/80)\*sin(221/400))/8 + 3/8, (51\*cos(561/1000)\*exp(-99/200))/40 - (9\*exp(-99/200)\*sin(561/1000))/8 + 3/8, (51\*cos(1139/2000)\*exp(-201/400))/40 - (9\*exp(-201/400)\*sin(1139/2000))/8 + 3/8, (51\*cos(289/500)\*exp(-51/100))/40 - (9\*exp(-51/100)\*sin(289/500))/8 + 3/8, (51\*cos(1173/2000)\*exp(-207/400))/40 - (9\*exp(-207/400)\*sin(1173/2000))/8 + 3/8, (51\*cos(119/200)\*exp(-21/40))/40 - (9\*exp(-21/40)\*sin(119/200))/8 + 3/8, (51\*cos(1207/2000)\*exp(-213/400))/40 - (9\*exp(-213/400)\*sin(1207/2000))/8 + 3/8, (51\*cos(153/250)\*exp(-27/50))/40 - (9\*exp(-27/50)\*sin(153/250))/8 + 3/8, (51\*cos(1241/2000)\*exp(-219/400))/40 - (9\*exp(-219/400)\*sin(1241/2000))/8 + 3/8, (51\*cos(629/1000)\*exp(-111/200))/40 - (9\*exp(-111/200)\*sin(629/1000))/8 + 3/8, (51\*cos(51/80)\*exp(-9/16))/40 - (9\*exp(-9/16)\*sin(51/80))/8 + 3/8, (51\*cos(323/500)\*exp(-57/100))/40 - (9\*exp(-57/100)\*sin(323/500))/8 + 3/8, (51\*cos(1309/2000)\*exp(-231/400))/40 - (9\*exp(-231/400)\*sin(1309/2000))/8 + 3/8, (51\*cos(663/1000)\*exp(-117/200))/40 - (9\*exp(-117/200)\*sin(663/1000))/8 + 3/8, (51\*cos(1343/2000)\*exp(-237/400))/40 - (9\*exp(-237/400)\*sin(1343/2000))/8 + 3/8, (51\*cos(17/25)\*exp(-3/5))/40 - (9\*exp(-3/5)\*sin(17/25))/8 + 3/8, (51\*cos(1377/2000)\*exp(-243/400))/40 - (9\*exp(-243/400)\*sin(1377/2000))/8 + 3/8, (51\*cos(697/1000)\*exp(-123/200))/40 - (9\*exp(-123/200)\*sin(697/1000))/8 + 3/8, (51\*cos(1411/2000)\*exp(-249/400))/40 - (9\*exp(-249/400)\*sin(1411/2000))/8 + 3/8, (51\*cos(357/500)\*exp(-63/100))/40 - (9\*exp(-63/100)\*sin(357/500))/8 + 3/8, (51\*cos(289/400)\*exp(-51/80))/40 - (9\*exp(-51/80)\*sin(289/400))/8 + 3/8, (51\*cos(731/1000)\*exp(-129/200))/40 - (9\*exp(-129/200)\*sin(731/1000))/8 + 3/8, (51\*cos(1479/2000)\*exp(-261/400))/40 - (9\*exp(-261/400)\*sin(1479/2000))/8 + 3/8, (51\*cos(187/250)\*exp(-33/50))/40 - (9\*exp(-33/50)\*sin(187/250))/8 + 3/8, (51\*cos(1513/2000)\*exp(-267/400))/40 - (9\*exp(-267/400)\*sin(1513/2000))/8 + 3/8, (51\*cos(153/200)\*exp(-27/40))/40 - (9\*exp(-27/40)\*sin(153/200))/8 + 3/8, (51\*cos(1547/2000)\*exp(-273/400))/40 - (9\*exp(-273/400)\*sin(1547/2000))/8 + 3/8, (51\*cos(391/500)\*exp(-69/100))/40 - (9\*exp(-69/100)\*sin(391/500))/8 + 3/8, (51\*cos(1581/2000)\*exp(-279/400))/40 - (9\*exp(-279/400)\*sin(1581/2000))/8 + 3/8, (51\*cos(799/1000)\*exp(-141/200))/40 - (9\*exp(-141/200)\*sin(799/1000))/8 + 3/8, (51\*cos(323/400)\*exp(-57/80))/40 - (9\*exp(-57/80)\*sin(323/400))/8 + 3/8, (51\*cos(102/125)\*exp(-18/25))/40 - (9\*exp(-18/25)\*sin(102/125))/8 + 3/8, (51\*cos(1649/2000)\*exp(-291/400))/40 - (9\*exp(-291/400)\*sin(1649/2000))/8 + 3/8, (51\*cos(833/1000)\*exp(-147/200))/40 - (9\*exp(-147/200)\*sin(833/1000))/8 + 3/8, (51\*cos(1683/2000)\*exp(-297/400))/40 - (9\*exp(-297/400)\*sin(1683/2000))/8 + 3/8, (51\*cos(17/20)\*exp(-3/4))/40 - (9\*exp(-3/4)\*sin(17/20))/8 + 3/8, (51\*cos(1717/2000)\*exp(-303/400))/40 - (9\*exp(-303/400)\*sin(1717/2000))/8 + 3/8, (51\*cos(867/1000)\*exp(-153/200))/40 - (9\*exp(-153/200)\*sin(867/1000))/8 + 3/8, (51\*cos(1751/2000)\*exp(-309/400))/40 - (9\*exp(-309/400)\*sin(1751/2000))/8 + 3/8, (51\*cos(221/250)\*exp(-39/50))/40 - (9\*exp(-39/50)\*sin(221/250))/8 + 3/8, (51\*cos(357/400)\*exp(-63/80))/40 - (9\*exp(-63/80)\*sin(357/400))/8 + 3/8, (51\*cos(901/1000)\*exp(-159/200))/40 - (9\*exp(-159/200)\*sin(901/1000))/8 + 3/8, (51\*cos(1819/2000)\*exp(-321/400))/40 - (9\*exp(-321/400)\*sin(1819/2000))/8 + 3/8, (51\*cos(459/500)\*exp(-81/100))/40 - (9\*exp(-81/100)\*sin(459/500))/8 + 3/8, (51\*cos(1853/2000)\*exp(-327/400))/40 - (9\*exp(-327/400)\*sin(1853/2000))/8 + 3/8, (51\*cos(187/200)\*exp(-33/40))/40 - (9\*exp(-33/40)\*sin(187/200))/8 + 3/8, (51\*cos(1887/2000)\*exp(-333/400))/40 - (9\*exp(-333/400)\*sin(1887/2000))/8 + 3/8, (51\*cos(119/125)\*exp(-21/25))/40 - (9\*exp(-21/25)\*sin(119/125))/8 + 3/8, (51\*cos(1921/2000)\*exp(-339/400))/40 - (9\*exp(-339/400)\*sin(1921/2000))/8 + 3/8, (51\*cos(969/1000)\*exp(-171/200))/40 - (9\*exp(-171/200)\*sin(969/1000))/8 + 3/8, (51\*cos(391/400)\*exp(-69/80))/40 - (9\*exp(-69/80)\*sin(391/400))/8 + 3/8, (51\*cos(493/500)\*exp(-87/100))/40 - (9\*exp(-87/100)\*sin(493/500))/8 + 3/8, (51\*cos(1989/2000)\*exp(-351/400))/40 - (9\*exp(-351/400)\*sin(1989/2000))/8 + 3/8, (51\*cos(1003/1000)\*exp(-177/200))/40 - (9\*exp(-177/200)\*sin(1003/1000))/8 + 3/8, (51\*cos(2023/2000)\*exp(-357/400))/40 - (9\*exp(-357/400)\*sin(2023/2000))/8 + 3/8, (51\*cos(51/50)\*exp(-9/10))/40 - (9\*exp(-9/10)\*sin(51/50))/8 + 3/8, (51\*cos(2057/2000)\*exp(-363/400))/40 - (9\*exp(-363/400)\*sin(2057/2000))/8 + 3/8, (51\*cos(1037/1000)\*exp(-183/200))/40 - (9\*exp(-183/200)\*sin(1037/1000))/8 + 3/8, (51\*cos(2091/2000)\*exp(-369/400))/40 - (9\*exp(-369/400)\*sin(2091/2000))/8 + 3/8, (51\*cos(527/500)\*exp(-93/100))/40 - (9\*exp(-93/100)\*sin(527/500))/8 + 3/8, (51\*cos(17/16)\*exp(-15/16))/40 - (9\*exp(-15/16)\*sin(17/16))/8 + 3/8, (51\*cos(1071/1000)\*exp(-189/200))/40 - (9\*exp(-189/200)\*sin(1071/1000))/8 + 3/8, (51\*cos(2159/2000)\*exp(-381/400))/40 - (9\*exp(-381/400)\*sin(2159/2000))/8 + 3/8, (51\*cos(136/125)\*exp(-24/25))/40 - (9\*exp(-24/25)\*sin(136/125))/8 + 3/8, (51\*cos(2193/2000)\*exp(-387/400))/40 - (9\*exp(-387/400)\*sin(2193/2000))/8 + 3/8, (51\*cos(221/200)\*exp(-39/40))/40 - (9\*exp(-39/40)\*sin(221/200))/8 + 3/8, (51\*cos(2227/2000)\*exp(-393/400))/40 - (9\*exp(-393/400)\*sin(2227/2000))/8 + 3/8, (51\*cos(561/500)\*exp(-99/100))/40 - (9\*exp(-99/100)\*sin(561/500))/8 + 3/8, (51\*cos(2261/2000)\*exp(-399/400))/40 - (9\*exp(-399/400)\*sin(2261/2000))/8 + 3/8, (51\*cos(1139/1000)\*exp(-201/200))/40 - (9\*exp(-201/200)\*sin(1139/1000))/8 + 3/8, (51\*cos(459/400)\*exp(-81/80))/40 - (9\*exp(-81/80)\*sin(459/400))/8 + 3/8, (51\*cos(289/250)\*exp(-51/50))/40 - (9\*exp(-51/50)\*sin(289/250))/8 + 3/8, (51\*cos(2329/2000)\*exp(-411/400))/40 - (9\*exp(-411/400)\*sin(2329/2000))/8 + 3/8, (51\*cos(1173/1000)\*exp(-207/200))/40 - (9\*exp(-207/200)\*sin(1173/1000))/8 + 3/8, (51\*cos(2363/2000)\*exp(-417/400))/40 - (9\*exp(-417/400)\*sin(2363/2000))/8 + 3/8, (51\*cos(119/100)\*exp(-21/20))/40 - (9\*exp(-21/20)\*sin(119/100))/8 + 3/8, (51\*cos(2397/2000)\*exp(-423/400))/40 - (9\*exp(-423/400)\*sin(2397/2000))/8 + 3/8, (51\*cos(1207/1000)\*exp(-213/200))/40 - (9\*exp(-213/200)\*sin(1207/1000))/8 + 3/8, (51\*cos(2431/2000)\*exp(-429/400))/40 - (9\*exp(-429/400)\*sin(2431/2000))/8 + 3/8, (51\*cos(153/125)\*exp(-27/25))/40 - (9\*exp(-27/25)\*sin(153/125))/8 + 3/8, (51\*cos(493/400)\*exp(-87/80))/40 - (9\*exp(-87/80)\*sin(493/400))/8 + 3/8, (51\*cos(1241/1000)\*exp(-219/200))/40 - (9\*exp(-219/200)\*sin(1241/1000))/8 + 3/8, (51\*cos(2499/2000)\*exp(-441/400))/40 - (9\*exp(-441/400)\*sin(2499/2000))/8 + 3/8, (51\*cos(629/500)\*exp(-111/100))/40 - (9\*exp(-111/100)\*sin(629/500))/8 + 3/8, (51\*cos(2533/2000)\*exp(-447/400))/40 - (9\*exp(-447/400)\*sin(2533/2000))/8 + 3/8, (51\*cos(51/40)\*exp(-9/8))/40 - (9\*exp(-9/8)\*sin(51/40))/8 + 3/8, (51\*cos(2567/2000)\*exp(-453/400))/40 - (9\*exp(-453/400)\*sin(2567/2000))/8 + 3/8, (51\*cos(323/250)\*exp(-57/50))/40 - (9\*exp(-57/50)\*sin(323/250))/8 + 3/8, (51\*cos(2601/2000)\*exp(-459/400))/40 - (9\*exp(-459/400)\*sin(2601/2000))/8 + 3/8, (51\*cos(1309/1000)\*exp(-231/200))/40 - (9\*exp(-231/200)\*sin(1309/1000))/8 + 3/8, (51\*cos(527/400)\*exp(-93/80))/40 - (9\*exp(-93/80)\*sin(527/400))/8 + 3/8, (51\*cos(663/500)\*exp(-117/100))/40 - (9\*exp(-117/100)\*sin(663/500))/8 + 3/8, (51\*cos(2669/2000)\*exp(-471/400))/40 - (9\*exp(-471/400)\*sin(2669/2000))/8 + 3/8, (51\*cos(1343/1000)\*exp(-237/200))/40 - (9\*exp(-237/200)\*sin(1343/1000))/8 + 3/8, (51\*cos(2703/2000)\*exp(-477/400))/40 - (9\*exp(-477/400)\*sin(2703/2000))/8 + 3/8, (51\*cos(34/25)\*exp(-6/5))/40 - (9\*exp(-6/5)\*sin(34/25))/8 + 3/8, (51\*cos(2737/2000)\*exp(-483/400))/40 - (9\*exp(-483/400)\*sin(2737/2000))/8 + 3/8, (51\*cos(1377/1000)\*exp(-243/200))/40 - (9\*exp(-243/200)\*sin(1377/1000))/8 + 3/8, (51\*cos(2771/2000)\*exp(-489/400))/40 - (9\*exp(-489/400)\*sin(2771/2000))/8 + 3/8, (51\*cos(697/500)\*exp(-123/100))/40 - (9\*exp(-123/100)\*sin(697/500))/8 + 3/8, (51\*cos(561/400)\*exp(-99/80))/40 - (9\*exp(-99/80)\*sin(561/400))/8 + 3/8, (51\*cos(1411/1000)\*exp(-249/200))/40 - (9\*exp(-249/200)\*sin(1411/1000))/8 + 3/8, (51\*cos(2839/2000)\*exp(-501/400))/40 - (9\*exp(-501/400)\*sin(2839/2000))/8 + 3/8, (51\*cos(357/250)\*exp(-63/50))/40 - (9\*exp(-63/50)\*sin(357/250))/8 + 3/8, (51\*cos(2873/2000)\*exp(-507/400))/40 - (9\*exp(-507/400)\*sin(2873/2000))/8 + 3/8, (51\*cos(289/200)\*exp(-51/40))/40 - (9\*exp(-51/40)\*sin(289/200))/8 + 3/8, (51\*cos(2907/2000)\*exp(-513/400))/40 - (9\*exp(-513/400)\*sin(2907/2000))/8 + 3/8, (51\*cos(731/500)\*exp(-129/100))/40 - (9\*exp(-129/100)\*sin(731/500))/8 + 3/8, (51\*cos(2941/2000)\*exp(-519/400))/40 - (9\*exp(-519/400)\*sin(2941/2000))/8 + 3/8, (51\*cos(1479/1000)\*exp(-261/200))/40 - (9\*exp(-261/200)\*sin(1479/1000))/8 + 3/8, (51\*cos(119/80)\*exp(-21/16))/40 - (9\*exp(-21/16)\*sin(119/80))/8 + 3/8, (51\*cos(187/125)\*exp(-33/25))/40 - (9\*exp(-33/25)\*sin(187/125))/8 + 3/8, (51\*cos(3009/2000)\*exp(-531/400))/40 - (9\*exp(-531/400)\*sin(3009/2000))/8 + 3/8, (51\*cos(1513/1000)\*exp(-267/200))/40 - (9\*exp(-267/200)\*sin(1513/1000))/8 + 3/8, (51\*cos(3043/2000)\*exp(-537/400))/40 - (9\*exp(-537/400)\*sin(3043/2000))/8 + 3/8, (51\*cos(153/100)\*exp(-27/20))/40 - (9\*exp(-27/20)\*sin(153/100))/8 + 3/8, (51\*cos(3077/2000)\*exp(-543/400))/40 - (9\*exp(-543/400)\*sin(3077/2000))/8 + 3/8, (51\*cos(1547/1000)\*exp(-273/200))/40 - (9\*exp(-273/200)\*sin(1547/1000))/8 + 3/8, (51\*cos(3111/2000)\*exp(-549/400))/40 - (9\*exp(-549/400)\*sin(3111/2000))/8 + 3/8, (51\*cos(391/250)\*exp(-69/50))/40 - (9\*exp(-69/50)\*sin(391/250))/8 + 3/8, (51\*cos(629/400)\*exp(-111/80))/40 - (9\*exp(-111/80)\*sin(629/400))/8 + 3/8, (51\*cos(1581/1000)\*exp(-279/200))/40 - (9\*exp(-279/200)\*sin(1581/1000))/8 + 3/8, (51\*cos(3179/2000)\*exp(-561/400))/40 - (9\*exp(-561/400)\*sin(3179/2000))/8 + 3/8, (51\*cos(799/500)\*exp(-141/100))/40 - (9\*exp(-141/100)\*sin(799/500))/8 + 3/8, (51\*cos(3213/2000)\*exp(-567/400))/40 - (9\*exp(-567/400)\*sin(3213/2000))/8 + 3/8, (51\*cos(323/200)\*exp(-57/40))/40 - (9\*exp(-57/40)\*sin(323/200))/8 + 3/8, (51\*cos(3247/2000)\*exp(-573/400))/40 - (9\*exp(-573/400)\*sin(3247/2000))/8 + 3/8, (51\*cos(204/125)\*exp(-36/25))/40 - (9\*exp(-36/25)\*sin(204/125))/8 + 3/8, (51\*cos(3281/2000)\*exp(-579/400))/40 - (9\*exp(-579/400)\*sin(3281/2000))/8 + 3/8, (51\*cos(1649/1000)\*exp(-291/200))/40 - (9\*exp(-291/200)\*sin(1649/1000))/8 + 3/8, (51\*cos(663/400)\*exp(-117/80))/40 - (9\*exp(-117/80)\*sin(663/400))/8 + 3/8, (51\*cos(833/500)\*exp(-147/100))/40 - (9\*exp(-147/100)\*sin(833/500))/8 + 3/8, (51\*cos(3349/2000)\*exp(-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, (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]

a =

- (153\*cos((17\*t)/20)\*exp(-(3\*t)/4))/80 - (6\*sin((17\*t)/20)\*exp(-(3\*t)/4))/25

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 - 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